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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION,
OFFICE OF EDITOR, WRINKLE DEPARTMENT,
MILWAUKEE, WIS., Oct. 25, 1905.

To the Members of the Western Gas Association: The next meeting of the Western Gas Association will in all probability be the last one, owing to the proposed merging of the three leading gas associations. Therefo e, every effort should be made to make it a rousing success in all respects, and it falls to my lot as Editor of the Wrinkle Department to again appeal to you for this department. I earnestly request those who have made promises of contributions to remember such as soon as possible, and I fully expect to hear from quite a number who have not made any promises, but who I know are in possession of something that would prove of value to the Wrinkle Department.

Yours very truly, B. MCADAM, Editor.

[NOTICE.]

Wrinkle Department, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF THE WRINKLE DEPT.,
719 CITIZENS BUILDING,
CLEVELAND, O., June 13, 1905.

The Wrinkle Department of the Ohio Gas Light Association is now ready to receive contributions for the 1906 collection, and a sketch or description of all devices, formulæ and methods of accomplishing objects pertaining to the gas business, is respectfully solicited.

Please send a written explanation, accompanied by any sketch, photograph or drawing, to the above address, or a description alone will suffice.

Hoping to receive prompt compliance,

Yours very truly, W. E. STEINWEDELL, Editor.

BRIEFLY TOLD.

THE RIGHT SORT OF FRATERNALITY.—We are indebted to Mr. N. W. Gifford, Secretary of the New England Association of Gas Engineers, for a copy of the following letter, recently recently received by him from Mr. Charles Warren Hunt, Secretary of the American Society of Civil Engineers. Its heartiness requires no comment at our hands, but it certainly shows the right sort of fraternality, a sort that might be practiced oftener to the benefit of the entire brotherhood of engineers:

AMERICAN SOCIETY OF CIVIL ENGINEERS,
220 West 57th street,
NEW YORK, Oct. 17th, 1905.

MR. N. W. GIFFORD, Secretary New England Association of Gas Engineers, 26 Central Square, East Boston, Mass.:

DEAR SIR:—It is the hope of the Board of Directors of the American Society of Civil Engineers that its cordial relations with other Associations of Engineers be maintained and, if possible, strengthened. I am,

SMITHSONIAN LIBRARY OF CONGRESS OCT 30

therefore, directed to say that the Society will always be glad to receive visits from your members, that its reading room and library are open to them and that their presence at any of its professional meetings (which are held at 8:30 P.M. on the first and third Wednesdays of each month, with the exception of July and August) will be most heartily welcome. Trusting that you will inform the membership of your Association that this is the case, and that we shall have the pleasure of receiving such of them as may find it convenient when in New York, I am, Yours faithfully, CHAS. WARREN HUNT, Secretary.

EIGHTH ANNUAL MEETING, KANSAS GAS, WATER, ELECTRIC LIGHT AND STREET RAILWAY ASSOCIATION.—The 1905 meeting of the named Association was held in the meeting hall of the Mercantile Club, Kansas City, Kas., the 13th and 14th insts., under very favoring conditions. The meeting was under the very capable direction of Mr. R. C. Johnston, of Lawrence, Kas., as President, whose annual message was a well put together statement of the standing of the Association and the interests it so worthily represents. The roll was increased by the placing thereon of 10 names and the officers elected for the ensuing year were:

President—W. E. Sweezy, Junction City.
First Vice-President—S. W. Sterrett, Kansas City.
Second Vice-President—F. D. Aley, Wichita.
Third Vice-President—C. L. Brown, Topeka.
Secretary and Treasurer—J. D. Nicholson, Newton.
Executive Committee—E. S. Springer, W. R. Morrison and J. D. Nicholson.

Lawrence was chosen as the next place of meeting. The paper list included the following numbers:

"The Tantalum Lamp," by Prof. B. F. Eyer, State Agricultural College.
"Producer Gas," by R. M. Sutton, Wichita, Kas.
"The High Efficiency of High Candle Power Lamps," by J. F. Schaefer, Kansas City, Mo.
"The Need of Sewage Disposal Plants in Kansas," by R. E. McDonnell, Kansas City, Mo.
"Co-operation in Management of Gas, Water, Electric Light and Street Railway Companies," by C. R. Maunsell, Topeka.
"Public Utilities and Municipalities," by Prof. E. H. S Bailey, University of Kansas.
"Purification," by E. S. Springer, Leavenworth, Kas.
"Relative Heat Producing Values of Natural Gas, Oil and Coal," by Prof. Erasmus Haworth, University of Kansas.

NOTES—

MR. DUDLEY D. TILTON, for many years Treasurer and Superintendent of the Newburyport (Mass.) Gas Light Company, died at his home in Newburyport the evening of the 16th inst. Deceased, who was in his 83d year, had been an invalid for some time, and had retired from active business in 1896. He was an esteemed member of the New England Association of Gas Engineers.

THE many friends of Mr. Thomas C. Carson, the valued President of the Iowa City (Ia.) Gas Light Company, were shocked to learn of his sudden, tragic death, in Philadelphia, the morning of the 18th inst. On that day when getting off a street car he slipped, the fall resulting in a fracture of the skull. He was born in Burlington, N. J., August 2d, 1834, and had been a resident of Iowa City since 1856, of which community he was a most prominent member.

MR. D. C. BRAINARD has resigned the post of General Manager to the Carthage (Mo.) Light, Heat and Power Company. His successor is Mr. O. J. McLane, of St. Louis.

MR. JOHN E. HOOD, Secretary and Treasurer of the Knoxville (Tenn.) Gas Company, recently paid into the City Treasury the sum of $2,501.23, which payment represented the royalty of 3 per cent. of the gross earnings of the Company for the past year that is exacted on the new franchise account. Under the agreement the Company is to pay 3 per cent. for the first 5 years, after which the rate increases ½ per cent. for each period of 5 years during the life of the franchise. The term thereof is 50 years.

THE Watkins (N. Y.) Consolidated Gas and Electric Company is capitalized in $50,000. The Directors are Messrs. M. L. Dreisbach, C. R. Horn and L. E. Varney.

MESSRS. W. G. MAXEY, of Oshkosh, Wis., and C. S. Jackman, of Janesville, Wis., have secured a controlling interest in the Beloit (Wis.) Gas Light and Coke Company.

EX-SENATOR H. C. FOSTER, of Gloucester, Mass., has been appointed to a responsible position in the service of the Consolidated Gas Companies, of Boston.

[Concluded from page 670.]

THIRTEENTH ANNUAL MEETING, MICHIGAN GAS ASSOCIATION.

HELD AT THE STEVENS BUILDING IN DETROIT, MICH., SEPTEMBER 20, 21 AND 22, 1905.

SECOND DAY—MORNING SESSION.

THE REMOVAL OF NAPHTHALINE FROM COAL GAS—*Continued.*

APPENDIX II.—*Methods of Sampling and Analysis.*

The method used for collecting the samples of tar and gas from the various works visited was essentially the same as that described in last year's paper. A glass tube about 6 inches long and containing fibrous asbestos and glass wool, a bulb tube containing picric acid solution, and a calibrated aspirator, were placed in series and the gas drawn through the system at different rates, depending upon the point of sampling. For the standpipe samples, most of which were drawn 4 or 5 inches from the top or on the bridge pipe, an aspirator of about ¼ cubic foot capacity was used and the gas was drawn into it at a rate of about ¼ cubic foot per hour. The weighed tube containing asbestos and glass wool was inserted in the hole tapped in the pipe so that the greater portion of it was outside, this being necessary on account of the high temperature of the gas at this point. When the tube was placed inside the pipe, it was found that a good deal of tar and oil passed the filter uncondensed to the picric acid bulb tube. For samples at all points except the standpipe, a cubic foot aspirator was used, the time of drawing a cubic foot of gas being 2 or 3 hours. Tar tubes in all these samples were placed inside the main because in that instance the samples collected would be more comparable to the conditions actually existing in the mains than otherwise.

The analysis of the tar collected in the asbestos filter is conducted as follows: The tube now containing tar and water incorporated in the asbestos is weighed, this giving by difference the weight of tar and moisture collected. The contents of the tube and, if the tar sticks to the glass, pieces of the glass itself are put into the volatilizing tube, which is then weighed. It is placed in series with the drying train and the naphthaline U-tube, the arrangement of which is shown in Fig. 2, and the whole set in the oven shown in Fig. 1. The oven is heated to

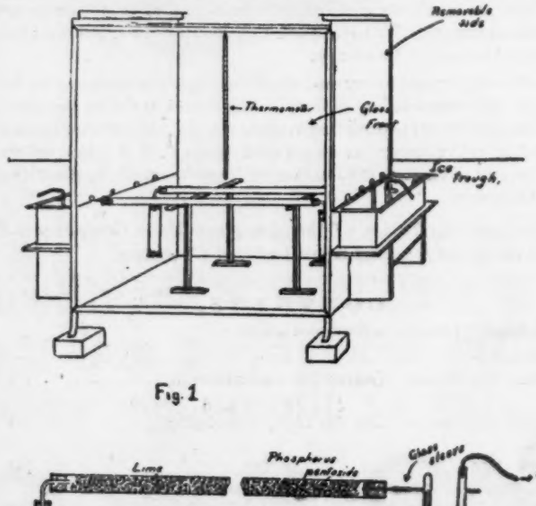


Fig. 1.

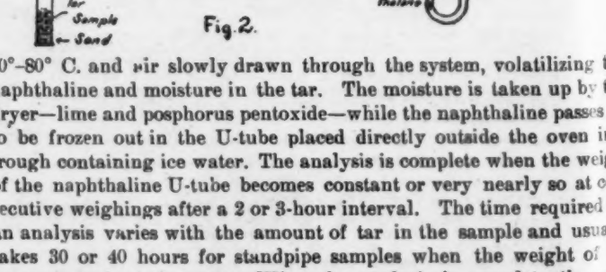


Fig. 2.

70°–80° C. and air slowly drawn through the system, volatilizing the naphthaline and moisture in the tar. The moisture is taken up by the dryer—lime and posphorus pentoxide—while the naphthaline passes on to be frozen out in the U-tube placed directly outside the oven in a trough containing ice water. The analysis is complete when the weight of the naphthaline U-tube becomes constant or very nearly so at consecutive weighings after a 2 or 3-hour interval. The time required for an analysis varies with the amount of tar in the sample and usually takes 30 or 40 hours for standpipe samples when the weight of tar amounts to 8 or 10 grams. When the analysis is complete, the volatilizing tube is again weighed, the loss giving the weight of moisture and naphthaline given off. Having the weight of naphthaline in the U-tube, we have the weight of moisture also, which, however, is at

best only approximate, because there is always more or less light oils, such as benzol, given off from the tar with the moisture and naphthaline, which we have at present no means of determining. Finally the volatilizing tube is set into a Soxhlet extractor and the remaining contents extracted with chloroform until free of all soluble material. After drying the tube is weighed, this giving the weight of free carbon in the tar.

The oven used is of galvanized iron and is 20 inches high by 16 inches wide by 14 inches deep. It is substantially as shown in the perspective, and is arranged so that eight samples may be worked at a time. For the volatilizing tube a 6-inch test tube is cut in two so that the top is about 4 inches in length. A piece of muslin is wired over the flare and a layer of sand about ½ inch deep is introduced. The tube is then ready for the contents of the tar filters. The drying train consists of a heavy glass tube about ½-inch internal diameter and 12 inches long, and contains broken lime for about ⅔ of its length and phosphorus pentoxide thoroughly incorporated in glass wool, and the other ⅓. This introduction of the glass wool with the phosphorus pentoxide prevents the gas from forming channels in the latter and thus aids in rendering the extraction of moisture complete before reaching the naphthaline U-tube. The lime used must be extremely rapid in its reaction with water in order to avoid too great expense for phosphorus pentoxide. We have found it necessary to make our own by igniting crushed limestone to a dull red heat for 2 hours in a muffle. If the lumps of lime are too small, the expansion attendant upon their slaking will crack the tube. If the lumps are too large the gas will not be dried sufficiently. We have found that a satisfactory mixture is obtained by taking everything that will pass a 4-mesh sieve and will not pass a 12-mesh. Connection with the naphthaline U-tube is made as shown in Fig. 2, through a glass sleeve made airtight by a piece of gum rubber tubing placed over the hole. This prevents the naphthaline coming in contact with the rubber. It is well known that rubber absorbs naphthaline. Nevertheless, we have found it safe to use rubber stoppers in the volatilizing oven. Rubber stoppers in frequent use absorb all they can take up and after a few runs cause no further trouble.

This method allows the estimation of water, anhydrous tar, free carbon and naphthaline. The separation of the water and anhydrous tar is not very accurate, the light oils which are vaporized by the air drawn through being reported as water. The estimation of naphthaline is, however, quite accurate. The air passing through will leave the system saturated with naphthaline at the temperature of ice water, but this loss need not amount to over a milligram for each 10 hours' run. It is possible that the naphthaline may be contaminated by other hydrocarbons and, as was pointed out last year, the naphthaline deposit is sometimes slightly oily and has a low melting point. An attempt has been made to determine the nature of this oil, but its small amount makes it difficult. It has been shown that it is an unsaturated hydrocarbon and it is very possible that it is the little known indene (C_9H_8), a transition product between benzol and naphthaline, which has been isolated from the tar distillates in which naphthaline occurs most abundantly. This oil has been found quite abundantly in our analyses of some tar distillates as would be expected of indene. It is also present in some tars to a greater extent than others. In any case, however, it seems justifiable to report it as naphthaline, because it will be found associated with naphthaline and will separate out with it on the large scale as well as the small. It is possible that the presence of this oily liquid may aid in preventing solid deposits of naphthaline, and its occurrence is worthy of note.

APPENDIX III.—*Method of Determining Absorbent Power of Tars for Naphthaline at Various Temperatures.*

A 1-ounce, wide-mouthed bottle, with a carefully ground glass stopper, is fitted with a band of heavy copper wire around the neck so that the stopper may be wired in, and a wire tripod is made to slip into the bottle. About 1 gram of tar is weighed into this bottle, and a small glass thimble containing naphthaline in amount not to exceed 25 per cent. of the weight of the tar is placed on the tripod above the tar. The stopper of the bottle is lubricated with a stiff rubber-vaseline lubricant and the stopper wired down. The bottle is then placed in a constant temperature oven where the naphthaline vaporizes until it has reached its vapor tension corresponding to the temperature. No more naphthaline can now vaporize except to replace that absorbed by tar. On account of the viscous nature of the tar and the small amount of surface exposed, this absorption will be very slow, so that it requires 2 or 3 months for the tar to become saturated. The process is checked from time to time by removing the bottles from the oven, opening them at once, removing the thimble of naphthaline and replacing the stopper before there has been any opportunity for the bottle to cool. After weighing the bottle, more naphthaline is put into the thimble if necessary and the bottle put back in the oven. The experiment is ended when the tar ceases to gain in weight, and the total gain in weight of the tar will give the amount of naphthaline absorbed. At the higher temperature of 75° C., a somewhat different arrangement has been found desirable, as explained below.

The possible sources of error in this process are leaks, undue gas pressures and vapor tension of the tar constituents.

Leaks occur occasionally and are detected by the failure of the bottle to attain constant weight and by the disagreement of results on duplicate samples. The difficulty of tight joints becomes greater with the higher temperatures because of the increasing fluidity of the lubricant and the greater gas pressures met with, as explained below. On this account, in the 75°-oven we have replaced the glass stoppered bottle by two test tubes, each about 3 inches long and ¾ inch in diameter, the tubes being selected so that one just fits inside the other. The inner one acts as the bottle while while the outer slips over it and dips about ½ inch into a bath of mercury, being held vertical by guides and kept immersed in the mercury by a lead cap. The mercury seal makes a tight joint and acts as a safety valve against possible unduly high internal gas pressures, which, however, are rarely encountered.

The second possible source of error in the process lies in the abnormal gas pressures. Solubilities of almost all substances are influenced by pressure and if on account of the vapor tension of benzol, water and other substances of relatively low boiling point, the internal pressure should rise much when the bottle was heated, the solubility of the naphthaline would be noticeably increased. A direct test of pressures at 45° C. showed a maximum plus pressure of 2 inches of mercury, a negligible amount. Tests at 75° C. showed at first a plus pressure which later gave way to a diminished pressure in the interior of the bottle, increasing for several days until it reached a maximum of about 6 inches of mercury. This was unexpected and is almost certainly due to absorption af the oxygen of the air in the bottle by some of the unsaturated constituents of the tar. In order to avoid sucking mercury up from the bath into the tar samples on these 75° tests, and to avoid error from abnormal pressures, it is sufficient to raise the outer tube momentarily clear of the mercury seal, when air will be drawn in to relieve the partial vacuum. This should be repeated once a day for the first 3 or 4 days, after which no further trouble need be apprehended.

An unavoidable source of error lies in the fact that the various substances in the tar possess vapor tensions, and dissolve to equilibrium in the naphthaline precisely as the naphthaline dissolves in the tar. This is shown by the occasional oily condition of the naphthaline remaining in the thimbles after they have been exposed in the bottles some weeks. Fortunately, the vapor tension of the constituents of the tar is mostly much below that of naphthaline and the error may be lessened by keeping the amount of naphthaline in the thimble at a minimum, as given in the directions. The error has been found serious at high temperatures, however, especially with some tar distillates possessing high vapor tensions, and has necessitated a longer process to obtain reliable figures as to the amount of naphthaline they can absorb. Instances have occurred where the tar showed a loss of weight after the bottle had been sealed for several weeks. It had absorbed naphthaline to the amount of possibly 50 milligrams, but it had given up more than that weight of its original substance to the naphthaline in the thimble, which had become an oily liquid. It is possible to obtain a correct result by analyzing this tar for naphthaline by the usual method of aspirating air through it. The error here lies in disregarding the amount of tar which has volatilized into the naphthaline thimble. But as this volatilized lighter portion would have a somewhat higher absorbent capacity than the residual heavier portion, the absorbent power would be reported as too low, which is better at least than reporting too high, and the error would not be a serious one.

APPENDIX IV.—*Method for Estimating Phenols in Ammoniacal Liquor.*

For the analysis a sample of one liter ammoniacal liquor is filtered and then acidified, preferably with hydrochloric acid. A large amount of sulphur separates, but the amount of phenols present is so small that they remain entirely in solution. The precipitated sulphur is carefully filtered out and the perfectly clear yellow solution is placed in a bottle or jar. One hundred cubic centimeters of chloroform are added and the mixture gently shaken for an hour. The water solution becomes much lighter in color and the chloroform becomes a dark brown. The two liquids are separated and the chloroform distilled off, leaving the phenols which, after drying, are in a condition to weigh.

This method is only an approximate one, as there will always be an equilibrium between the phenols dissolved in the water and in the chloroform. It would be possible to make it more exact by extracting with successive fresh portions of chloroform, but we have preferred to work a check analysis, starting with known amounts of phenols, and make the necessary correction. The phenols used had been separated from a sample of high boiling tar distillate and were, therefore, similar to those usually met with in tar. For the check experiment, weighed amounts of these phenols were dissolved in a liter of ammonium sulphide of specific gravity 1.01. The results follow:

Expt. No.	Wt. Phenols Dissolved Grams.	Wt. Phenols Recovered Grams.	Per Cent. Recovered.
1	2.285	.587	25.2
2	4.566	1.211	26.3
3	3.198	.789	24.8

The percentages recovered are small but very concordant and independent of the weight of phenol within the limits met with in practice. This is to be expected, however, as almost the only source of error lies in the incomplete removal of the phenols by the chloroform, and the relative amount of phenols dissolving in the water and chloroform will be dependent only upon the relative amounts of the two sol vents. So long as the amounts of chloroform and ammoniacal liquor are unchanged, the percentage recovery should be a constant. The method is believed to be fairly accurate, provided each analyst makes his own check analysis and determines for himself the necessary corrections.

Discussion.

The President—If there is anybody here who could completely digest that paper in one reading of it I would like to hear from him first. I think it is one of those subjects which we will take home with us and study there during the long winter evenings under a $1.98 reading lamp or something of that sort. The results that are indicated here will probably bring forth considerable discussion over points that have been noted by operators in the conduct of works. Mr. Dewey.

Mr. Dewey—I would not care to express an opinion now. I have not studied this paper over previous to coming to the meeting. During the past year I have been out of touch with the naphthaline problem. I did note some things, however, in the reading of the paper, which make it appear to me that it will be necessary to study this problem some time longer to determine the effect, for instance on the P. & A.: "We note in Detroit that the proportion of naphthaline dissolved in tar was 94½ per cent., while that in Ann Arbor was 95 per cent." Of course, only 1 per cent. difference, but that 1 per cent. left in gas makes a considerable difference when it gets to the mains. I also note that the free carbon in the tar at Detroit was 39.3 per cent, while in Ann Arbor it was 33.2 per cent. The point I wish to make is, why is it that, under practically the same conditions otherwise, that the proportion of naphthaline dissolved in tar in Detroit is less than it is in Ann Arbor? It may be that it was because of the larger amount of free carbon, or larger amount of water in the tar. There is another point that I thought of in connection with the dissolving, or the effect of the ammoniacal liquors upon the saturation of phenols, and the setting free ultimately of the naphthaline in the tar. I know it is the practice in Detroit to return the liquor from the main to the main—in other words it is a continuous system. This is induced by means of jets—of course, you are all familiar with it—and I wondered if that ammoniacal water would have a tendency at that point to do as stated on page 16 here. I just spoke to Professor White about it, and he did not think it would, inasmuch as the ammoniacal liquors at that point would have ammonia salts and consequently being acids they would not react on the phenols. However that may be, another question I would like to ask, if I had time, is this, was the overflow from the hydraulic main being introduced into the washer scrubber or rotary scrubber? I know we did that for a little while down there, and we did not know of any bad results, and I wondered what effect the introducing of the ammoniacal liquor which was the excess of the amount put into the hydraulic main would have upon the liberation of the naphthaline when introduced into the rotary scrubber. Another point which was not made clear in the paper, especially in the table on page 11 as to the percentage of naphthaline taken out by the P. & A. separator. What was the difference of pressure on the P. & A. at this point? What would be the difference of pressure on the P. & A., and what effect would that have upon the absorption of the naphthaline? This point will probably be taken up in next year's work. To me it is the most interesting paper that has been read before the Michigan Gas Association that I have heard, and in the light of the work that has been done here, I think it would be interesting to branch off at some future period as to the effect and the cause—rather the cause of the formation of naphthaline. As is stated in the paper, page 9, it is not the province of the paper to determine that. There are very interesting conclusions that might be made from this paper that would lead us to believe there is something in the peculiar manner of distillation that would account for the formation of naphthaline under different conditions.

Mr. Tippey—In the new plant at Station A, at which these tests were made, there was a time in which we had considerable trouble with naphthaline; that is, previous to the time these tests were made. At that time the charging machine did not take the coal to the back end of the retort, and we undoubtedly made a very great deal more naphthaline than while the tests were in progress. We made also a heavier tar, and a great deal more lampblack; so that at the same time we were making more naphthaline, we made a tar that would not be capable of dissolving as much naphthaline as tar made while the tests were in progress. We had naphthaline stoppages in the condensers, the washers and scrubbers. While this bad condition still existed, as far as tar extractor was concerned, we by-passed it. We let these all forward through the condenser, and naphthaline stoppages ceased, and we did not have any more trouble. It has been our practice ever since that time to allow quite a little tar to go by the P. & A. We have not had any more trouble from naphthaline since that time in the condensers. I noticed in some of these tests that there is more tar in the gas at the inlet to the secondary condenser than at the outlet, showing that the gas lost naphthaline in passing through the condenser. I also noticed that the tar at the outlet of the condenser contains more naphthaline, showing that the gas lost naphthaline and the tar picked it up. I am inclined to think if we had more perfect contact of the hot tar and hot gas before the P. & A. is reached, so that it could thoroughly absorb the naphthaline, if we were to remove the tar entirely at the inlet to the condenser, we would not have any naphthaline at all, and that as there would be no tar to reach the scrubber, it could not give up the naphthaline at that point. But as in our plant we cannot get that thorough contact—enough thorough contact to take out all the naphthaline before the P. & A. is reached—that allows the tar to go through. The temperature at the inlet of the secondary condenser is about 110° to about 90°. At this temperature the tar has a great affinity for absorbing naphthaline, so that we have practically double contact of the tar and the hot gas by allowing the tar to cool in the secondary condenser.

The Secretary—Under those conditions wouldn't it be wise to put the P. & A. after the secondary condenser?

Mr. Tippey—I don't know why you could not. The only reason why it should not be placed there would be that if the gas and tar to any extent were brought in contact below the temperature of 95° or 100°, the illuminating value of the gas is deteriorated. We tried that repeatedly at our plant, dropping the temperature in the primary condenser before the P. & A. is reached below 95°, and in every case the candle power dropped. We found about 95° was the dividing line. To be safe we ran to above 100°, and it took most of the tar out of the P. & A.—the heavy tars.

Mr. Barthold—Placing the P. & A. after the secondary condenser there would be so little tar I don't think the present form of the P. & A. would take out that last trace. The paper suggests that they build the foul mains larger to give the contact of the tar vapor in gas after it leaves the hydraulic main. This perhaps could be accomplished by putting in a large scrubber shell without any trays in it. I had charge of the old works in Milwaukee. They had a large shell in which the gas passed on leaving the hydraulic main. They claimed that it did a great deal to keep naphthaline down in the works. I am not prepared to discuss this paper as it requires a great deal of time to digest thoroughly; but I want to say it is going at the naphthaline question in the right manner From year to year the different Associations have discussed this subject, and the discussion has been more or less *repetition*, did not bring forth anything new; and I am glad that the Michigan Association is connected with this class of work. It is along the proper line and we will derive some benefit. This work ought to place the Michigan Gas Association right to the front.

Mr. Russell—The paper was quite a revelation to me. Like Mr. Dewey, for the last few years I have been out of touch with naphthaline troubles; but the fact that the higher the temperature of tar, the more naphthaline it absorbs, seems to me almost revolutionary in character. I have always maintained the way to stop naphthaline troubles was to have a primary condenser—air condenser. I had a specially good opportunity to notice that at Cincinnati. There there is no P. & A. whatever; but they have a long series of pipes acting as a primary condenser, and all during my experience there we had ab-

solutely no trouble with naphthaline, although I will say that tars went past to the purifier. Evidently the contact of hot gas with hot tar was doing something for naphthaline in those works. I do not see why Detroit should have more tar where they have more free carbon than at Ann Arbor. At Detroit they have lower temperatures, and I should think it would be just the opposite condition in regard to tar. I connection with the whole paper I think the work should be continued another year. It seems to me that this is the first paper that has pointed out anything definite to the gas man. I think most of us, after reading it, want to go home and study by lamplight, and are more apt to get out in the works and raise the temperatures, and lower them, and see what the effect is. I think another year they will be able to tell us just how to get the naphthaline out of the gas and just where we should get it out. In other words, just how to handle it and what sort of apparatus to use, although gas men will use their judgment about that. After that is determined, it seems to me they ought to tell us how not to make it at all; that is, not to make it in any more than a reasonable amount. One problem is to get rid of it after you have made it; but another is how not to make it.

The President—What is your experience at Grand Rapids?

Mr. Traver—My experience has been similar to Mr. Tippey's. We have had a great deal of trouble with naphthaline in the line of scrubbers; but since we got rid of that by by-passing and P. & A., and allowing some of the tars to go through, we have not been bothered lately at all. The paper is very interesting to me at the present time, because we have just changed over our condensing system entirely. We are pumping the gas hot, and the gas is being kept in contact with the tar much longer at this high temperature than any other works in the State at the present time. The result will be probably that the man who has the fellowship for next year, Mr. Barnes, will get some results that he could not get in any other works in the State. The paper itself is certainly the most interesting naphthaline paper I think that has ever been written; but I have not thoroughly digested it and won't for a long while. It will take a lot of study. There is one point that impresses me, and that is the amount of naphthaline formed at different hours. I always thought that more naphthaline would be formed during the latter hours rather than the first where the gas flow is very swift. We find according to these experiments that it is not the case. I don't know exactly how to explain that. I would like to ask Prof. White if he can give any explanation why that would be?

Prof. Campbell—I do not know as I am in a position to add anything to this paper. I will simply say that I feel very much gratified at the way this paper has been received here, and I would like to take occasion also to say that it seems to indorse the position on which the Gas Association has been supporting our fellowship in response to the request that I made at the time we got them to support the fellowship. The function of the University is to develop new truths, new facts, simply to bring out facts themselves irrespective of their bearing, and this paper certainly has brought out a number of extremely interesting facts. As Mr. Traver—especially Mr. Russell—has said, we might teach them not only how to remove naphthaline, but also how to prevent its formation. Now perhaps I might say that I do not feel that it is our place to show the mechanical side of how to remove naphthaline. The object of this research work is to bring out knowledge, definite facts as to why and when naphthaline is removed. Mr. White has proven to you that with a rise of temperature there is an increased solvent action of the tar, and he has brought out some facts. Now I have no doubt in my mind but what there is ingenuity enough among the members of the Gas Association to apply that knowledge practically for the benefit of the gas business. It is not the object of the University to apply this knowledge. We try to bring out new knowledge. Now the broader problem which Mr. Russell has suggested there, as to the cause of naphthaline, brings out, as stated in the paper, the whole question of distillation. To my mind, one who thinks ahead a little bit, can conceive what an enormous field there is there for research. It has been scarcely touched at all, and I think it is one of the most promising fields for subsequent research. In this paper there is shown a variation in the solvent action of tar, as influenced by temperature. Then comes the question that we see often from this, that there is a variation in the solvent action of different tars at the same temperature. Now that at once would lead to the question in the destructive distillation of coal, what is the relation between time and temperature, and different coals, and combination coals and tars? If one stops to think on that he will see at once there is work enough there for years to come. In research work for the production of new facts and new knowledge. I think there will be no question but what the gas men themselves can appreciate new facts and can apply them to the betterment of the gas industry. I appreciate very much the support the fellowship has received, and I trust the members will feel that their support and the money they put in there are really well invested. (Applause.)

The President—I think I can answer the Professor for the Association, that they have a most high appreciation of the extremely valuable and I might say unselfish work which the University is doing, and the hearty manner in which they have carried on the work, which absolutely could not have been done by any member of the Association. I do not think it could have been done by any company individually, by reason of the length of time and the large facilities required, and the collateral facilities, if I may use the term, which the University has for this work. It certainly is gratifying to the Association.

Mr. Dewey—One question I would like to ask—I was not quite certain at that time, but what it was treated in the paper, that is, Prof. Campbell spoke of it—the solvent action of different kinds of tar. Why I ask this is from the experience at Grand Rapids in dividing it by by-passing and allowing a portion of the lighter tars to pass the P. & A. What is the absorbing power of that very light tar that we allow to go through? I have been unable to find out. I think probably the reason why Detroit and Grand Rapids have had different results from what we would expect is probably explained by the fact that this tar undoubtedly has a very high absorbing power, and the naphthaline must be absorbed by this light tar.

The President—Are there any other points or questions?

Mr. Russell—It occurs to me that both Grand Rapids' and Detroit's difficulty is rather more subject to the time element than anything else. When they are operating the P. & A. differentially they increase their absorbing surface and the gas passes too fast. All through the paper it has been shown that time played a very important part. I suggest that might be true in the P. & A., that it flows at such a speed that it has not time—in other words, if you had a larger P. & A. it might stop that difficulty.

Mr. Ball—I have not anything to add. I was just wishing that I had time to study this paper before I came down. I notice that the tar at a temperature of 106° absorbs almost 50 per cent. of naphthaline, and the tar in the hydraulic main is perhaps not quite that temperature, but almost that. It seems to me in our experiments last year we found that it did not hold over 5 per cent. to 6 per cent., and it occurred to me what became of that naphthaline, whether it was redistilled or volatilized in some way. That is the suggestion that occurred to me.

The President—I will ask Prof. White to close the discussion on this paper.

Mr. Stiles—I would like to know if there has been any experiment heretofore showing the amount of naphthaline in the gas made from different kinds of coal—Illinois coal or coal from different localities?

Prof. White—A number of gentlemen have dwelt upon much the same points, so I shall not attempt to take up the questions as they were asked one by one, but rather the different subjects. I think the first one was by Mr. Dewey in regard to fixed ammonia taking out phenols from the gas. I do not think that fixed ammonia would have the same effect as volatile ammonia. In the hydraulic main the ammonia is largely firmly fixed as salts, but in the scrubber, where the volatile ammonia is largely in excess, I think that the ammonia will continue to act in removing phenols, unless some steps be taken to actually acidify the liquor in the scrubbers, which would be something of doubtful practicability. At least it requires a different structure of scrubber. In regard to differential pressure of the P. & A., we have no complete records of the differential pressures in many of our works' tests, for they did not have differential pressure gauges by which we could make tests. Of course, the greater the differential pressure the greater is the rate of gas passing through perforations in the screen of the P. & A.; and there can be such a thing, I can imagine, that the gas will pass through so fast that the tar would not be deposited. I can see that gas passing through very fast at a high differential pressure might not deposit tar as the one passing through more slowly. It is complicated, however, as almost all these questions are complicated by a number of different factors. One of them, I am quite certain, is the temperature of the gas entering the P. & A. The important point about that is due to the difference in the viscosity of the tar at the different temperatures. If the temperature of the P. & A. is low, there has been more tar separated out in the primary condensers; there is not so much going to the P. & A., and that tar is quite stiff, and as it goes through the perforations and strikes the baffle plate it has a tendency to stick and be removed from the gas. If the temperature at the outlet of the primary condenser is high, more tar will pass through to the P. & A., and that tar will be fluid, and the tendency will be when it strikes the baffle plate to splash back, especially if it is going at a high velocity, and under such circum-

stances I can see that more tar will pass through. The question as to the effect of the denser tars and lighter tars, as they go forward, is one that will have to be settled by more work. We have one or two tests under way on that point, but it takes 3 months to determine the amount of naphthaline which tar can take up at a given temperature, and there are tests going on at the University which will not be out in time to report at this meeting. In another year we will have some further evidence on the subject. The practice at Detroit and Grand Rapids of letting some tars purposely pass the P. & A. is extremely interesting. Some tests have already been made which were not reported on at Detroit. With Mr. Tippey's co-operation we expect to keep on until we find just what the effect is of letting some of the tars go forward. When we get to the question of the formation of naphthaline we are very much in the dark, and I think I cannot answer any of the questions which have been put in regard to the formation of naphthaline. We know that apparently trivial things influence the amount of its formation very much. At the University this year Mr. Barnes tried for 6 months to distil one sample of coal in the small laboratory apparatus, where we had our conditions as nearly uniform as we could get them, and he tried to determine the influence of temperature on the amonnt of naphthaline formed in that laboratory apparatus; but in almost every case there was evidently some variable which was more important than the variable of temperature. We came to the conclusion, after some 8 or 10 distillations, that it was practically the method of charging that little retort that was causing most of our difficulty. The method of charging was more important than the temperature. We made some experiments at the works, and we think the data is not sufficient to allow anyone to explain them, and so they are put away until we get enough information to let us explain the results we have. We know the charging exerts a big influence, and the temperature must exert some influence; but we do not know why it is that Detroit has a higher percentage of free carbon than Ann Arbor. Prof. Campbell has outlined very well, I think, our plan in attacking this problem. We hope to attain considerable further information during the coming year. If the question is to be solved under the best conditions it can only be done when we can regulate or eliminate as many of those absolute variables as is possible. We ought to be able to work with only one condition at a time, and we will never be able to do that in the gas works, because there are certainly 10 or possibly 100 differences which hinder us. The ideal way would be to isolate a single, full-sized retort provided with its own condensing system. Under those circumstances we could probably regulate our conditions fairly well and obtain results much more quickly than we otherwise could, and I am quite confident that those results could then be applied to the full-sized plant and be found applicable. I have to thank the Association and the gentlemen for the very cordial support which we have everywhere found in conducting the experiments we made. Wherever we have been at the different works there has been the utmost courtesy shown, and we beg to thank the Association for it. (Applause.)

The President—Prof. White, I do not know that I ought to call on you for anything more, but I would like to ask what percentage of tar you have found in the gas—percentage of the total tar produced—at the entry to the scrubbing system in those experiments, or is it given?

Prof. White—It is not given in so many words, but only 1 to 3 per cent. of the total tar produced ever gets as far as the scrubbers.

The President—The reason I asked is, it seems to be very difficult to eliminate all the tars—tar vapors after the use of water or ammoniacal liquors—in some manner. It is evident from what you have been doing this year that to eliminate any tars with ammoniacal liquors is something we will look upon as a distinct question. If we can get all those tars out by mechanical means it would seem that we would be largely at the end of this trouble. As I take it, from the result of the work this year, there is something that I do not think has ever been determined before. Still, as you suggest, a man would not think of correcting the conditions under his reading lamp. I think that is one of the things we will have probably to study under the same reading lamp. I had a discussion with Prof. White a few days ago in respect to some proposed apparatus for the University. You could conduct this work in a little more systematic mauner. It was suggested last year that there should be an experimental plant put up at the University, making it possibly to a quarter size, provide a complete plant from the retort all the way through to the holder, and the University acted on that matter, and were far-sighted enough to say that they would find space and accommodation for anything that we would supply, and it is in such shape that it could be put in at any time; but it did not seem that that would meet the conditions which we were striving for. If the retort were quarter size the gas produced in the rear end of it would have only half the travel of gas in a retort such as we are using. We use about a 9-foot retort, because it is about as far as a man can throw coal. We would not want to use a horizontal retort, beca use we would have a disproportion of investment to capacity. So there are practical limits as to the size of the apparatus, and to produce our gas in a retort which would not give the same conditions as a retort used in practice would be artificial conditions. It seemed to us that the present work for us—possibly looking at it from a commercial standpoint—would be to let the University endeavor to prevent some of the troubles which we have been having, when they are producing under customary circumstances. It is now proposed, as Prof. Campbell suggests, to isolate 3 retorts in the Ann Arbor works. Mr. Douglas has kindly consented that this shall be done under certain conditions, which are exceedingly favorable to the Association. We are now endeavoring to devise apparatus which can handle a small quantity of gas and give it precisely the same treatment, actual and theoretical, which it would receive in a works where a large quantity is handled. It may seem strange to some, but it would be a simpler process to handle 1,000,000 feet of gas than it would to handle 5,000. However, we hope before another year to have something along this line accomplished. I think, without further action on the part of the Association, a vote of thanks will be entered upon the record to the Faculty for the work that they have done.

An adjournment was then taken to 2 P.M.

Second Day—Afternoon Session.

The President—We are ready for our next paper. This is a paper upon arc lighting, which has been hurriedly prepared, through the courtesy of Mr. Murray. (Applause.)

OUTSIDE LIGHTING.

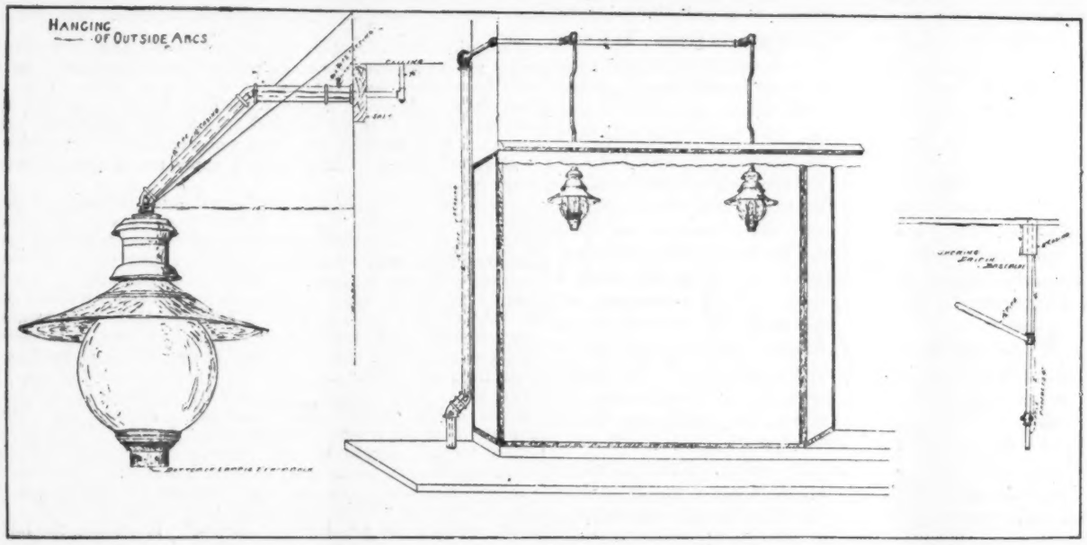
A successful outdoor gas arc has made possibilities for considerable outdoor and window lighting, which has heretofore been left almost entirely with the electric people. In the past, most gas companies who installed outside lamps in front of a place of business placed the lamp in the entry way, no provision being made to protect the gas from freezing. In most cases a connection was made from a drop inside the building and a ¾-pipe to the outside where the lamp was hung. Sometimes a drip was placed on the ¾-run, but, in most cases, even this was not done, and in severe winter weather the lamp would be out of commission, to the disgust of both the consumer and the gas company. With the above installation you lighted only the entry way and not the windows and the consumer was obliged to light his windows with either gas or electricity the same as before, and as you are aware the electric people have a sliding scale which is so manipulated that if the consumer lights his window with electricity and the balance of his store with gas, he is charged practically as much for this amount of electric service as he would if he had used electricity exclusively, and on this account a great many merchants have discontinued the use of gas in their places of business, as they were obliged to use electricity in their windows.

Within the last year a great many companies have been experimenting and have demonstrated beyond the possibility of a doubt that the average window, if it is not too deep, can be better lighted for less money with outside gas arcs than by any other means. By this I mean that the initial cost of the gas equipment will not be any greater than the initial cost of the electric wiring, sockets, etc., and the cost of operating the lamps on the same number of burning hours will show a saving of from 40 per cent. to 60 per cent. On a window 20 feet wide 3 outside gas arcs will throw more of a better light in the window than fifty 16-candle power incandescents, besides a brilliant light on the front of the store, lighting the sidewalk to the curb, and make a light attraction that is noticeable up and down the street for a considerable distance.

Considered from the advertiser's standpoint, both for the consumer and the gas company, a row of outside gas arcs which illuminates the windows and entire front brilliantly, is the cheapest good advertising that I know of. It distinguishes his store from the other fellows, because he not only has more light in his window than the other fellow, but has the additional light on the outside and for less money.

An outside gas arc, if properly maintained and adjusted, will burn from dusk until 10:30, which is an average of 4 hours per night for the entire year (365 days), or a consumption of 2,000 feet of gas per month (which is equal to that of the average gas range); mighty good business, as the gas company gets the benefit of some of the advertising.

In this city we have what we call a "turn on and off" service which we give the outside arc customer without charge and at a slight expense to us we have the assurance that the lamps are "working while we



sleep," and that the average consumption per lamp per year will be 24,000 feeet of gas.

The effectiveness of the idea increases in proportion to the number of lamps that are hung in succession; for instance, two arcs hung in front a man's store more than double the effectiveness of one, and 10 or 25 in proportion. The Detroit City Gas Company has recently made a unique installation of outside lighting which, I believe, is the first in the country. They have extended a line of pipe around the entire block in which the gas office is situated (John R. to Wilcox streets), and have installed 39 outside gas arcs, which displace all the window lighting which has heretofore been done from the inside. This installation not only lights the windows better than they were lighted heretofore, but lights the sidewalk and front of the block so well that if you would shut your eyes and forget where you were when you opened them, you would think you were on "Bright Broadway."

Installation.—Where only 1 or 2 outside lamps are to be installed in front of store or business place and ¼-inch drop is found inside window with good supply, ¼-inch pipe is attached to this, carried out through window and extended down to lamp with 45° ells.

For this installation four $\frac{3}{16}$-inch holes are drilled in top of lamp and a 2 × 1¼ reducing coupling is placed so as to come on outside of openings in top of lamp. From this reducer 1¼-inch pipe, termed casing, is extended back within 1 inch of window sash, where a reducing tee is used with ¼ branch looking up from which a return bend (plain ell and street ell) is used to conduct heat from inside casing and thus exclude water from rain storms, etc. The end of the reducing tee fits closely ¼ inch drop.

For 3 or more lamps a riser is run on outside of building in the least conspicuous place, a larger pipe of casing placed over riser which opens into basement or cellar, thus conducting warm air from basement up to top of riser.

A tee is placed "bull headed" on top of casing to exclude water from rain, etc. Where riser is cased in this manner it is not necessary to case run or drops. Drop is taken from side branch of tee and where possible all drip water carried back to riser where a large drip is placed in cellar.

As it is sometimes impossible to carry all drip back to riser an additional drip or extra riser is placed between store fronts, or next best location, and carried into basement. This riser is also cased in the same as riser with a stop-cock placed in bottom to let out drip water. On outside run, between Wilcox and John R., there will be 3 main risers and 2 drip risers when job is finished.

The President—Gentlemen, our time is more or less limited for this afternoon, unless we are going to work overtime, which I suppose no good gas man would like to do, but we have a contribution here from Mr. Mason, of the Toledo Electric Light and Gas Heating Company. It fits in evidently with the paper we have just heard and with the paper of Mr. Chamberlain we are to hear. I am inclined to think it would be well to read all those three papers at once and have the discussion at the same time. Mr. Persons was to read this paper of Mr. Bert Mason, but as he is not here I will try and do it myself and save time.

LIGHTS FOR ADVERTISING.

Use lights for advertising, because that is the best manner by which you can advertise. Now what does this mean? It means just this: You can get more for your money advertising with lights than any other kind of advertising. Your lights will give you the quickest results, and you can prove the results attained from lighting to your entire satisfaction at once. The writer does not wish to condemn newspaper advertising, but insomuch as the writer has made the statement that light is the cheapest aud best, it is his duty to show you that his statement is correct. In this up-to-date age, less than 30 inches per day of newspaper advertising is of little or no value; all business men of sound judgment concede this to be a fact. Why? Simply because the large merchant uses so much space that the smaller ad. is hardly noticeable, if indeed at all. Has it ever occurred to you, when you take up your paper to read your ad., how long it takes you to find what you are looking for? Now, if you cannot find what you are looking for, how can you expect the public to find what they are looking for? For half the amount of what 30 inches of newspaper advertising would cost you you can buy gas enough to light your store so attractively that everybody could see your wares without having to search the newspapers for them. Perhaps you will say, "This is all very well if I were on the main street." Not so. The reason you are not on the main street is just the strongest reason why you should advertise with light. Again, why? Because generally the main street in most cities and towns is well lighted. This is also the reason why they become the main street or streets. If you are located on a side street, light up your place, crowd in all the lights you can and your place will be a blaze of sunshine in the midst of darkness. Your store will be distinctive in itself, because light is an attraction to all people. It is the greatest contrast to darkness, it is a thing of beauty, and beauty is an attraction to the rich and poor, educated and uneducated; in fact, all. Yes, everybody is attracted by light. However, the man who lights up his store first on the side street will not be long alone. The other merchants near him will notice his success and very soon he will see his near neighbor trying to outdo him by lighting up better than he has. Now two or three places on your street will light up to outdo both you and your neighbor, and in the very near future you will find you have a well lighted, attractive and beautiful store that will attract much new business. What does this mean? It means that if you are wise when you start in to light your store you will secure a long lease at your present rent. This is what you have accomplished. By lighting up your store you started others to do the same, soon all the street became well lighted and thus you have been the means of creating another main street. Of course you have saved the expense of moving on the main street at a greatly advanced rate of rent, you have leased your present store at a very low rent for a number of years, and last of all you have brought the main street to you instead of moving to the main street. There is every reason to believe that the new main street will do more business than the old main street because of its newness. Now then, when the street is well lighted your chances of doing business have not decreased, the street has become so attractive that there are many thousands of people passing now, consequently the increased number of passers-by on your street have increased the number of those who enter your store, and of course you have increased the number of sales and also your profits.

I have said that lights will give you the quickest results; to prove this

statement all you have to do is to stand outside of a well lighted store for half an hour, then devote half an hour at a dark store. You can see the results in 30 minutes. Furthermore, I said you can prove the results. All you have to do in this case is to go to some nearby town or city, ask the owner of a store that is well lighted if it pays him to light up, and his answer will be your proof. The reason you will have to go to some other city or town for information is, because the well lighted man in your own place is fearful of somebody else learning his secret of success. The vice of defect is far worse to the business man than the vice of excess. There is a tendency when a business man starts in to advertise to commit the vice of defect. He does this in the following manner: Instead of trying to see how much money he can spend in the best possible manner, he will try to spend as little as possible, and 9 out of 10 all he spends is a total loss. One man will open up a store with a handful of goods and one light, then say, "Well I don't care to spend any more money until business will warrant it." The man's business will never warrant the investment of any more money, because he is defective and not capable to manage any business. To advertise with light is not an idle fancy or a mere dream, it is following up what the large cities have done, and are doing. Take any of the large cities. Do you suppose they light up their stores and keep them well lighted all night just to spend money? That is not reasonable, it is done to make money. Having proven to you that light is the cheapest and best kind of advertising, let us consider for a moment how to use it, and use it right. The old way to light a store is to commence in the rear and light to the front as fast as daylight leaves the store. This way is wrong. The right way to light a store is to begin outside, then light the windows, next the inside of the store, and last the rear of the store. The outside lights attract people to your store, the window lights attract them in, the inside lights show off your wares to the best possible advantage, and now you have a system of advertising with lights that is complete, cheap, attractive and the best on the market to-day. The man who hesitates is lost. After all he may be found, but the business man who hesitates to acknowledge the benefits of advertising with light is worse than lost; he is dead, and will never come to light. You probably have seen or know of one or several stores that have been opened by men who have entirely failed to do anything and given up in despair. Again a man has come along and opened the same kind of a store where those other people had failed, and yet this man has made a great success. Look this man up and you will find that the man who succeeded tried to see how much money he could spend to make his place attractive and beautiful by lights.

At this part of my paper let us consider newspaper advertising, circular advertising, and in fact most every kind of advertising and its connection and relationship to advertising with lights. For instance, if a man is a large newspaper advertiser or circular advertiser; we will take for example that he is advertising Kimer's Swamp Root thoroughly and extensively. What does he accomplish with all of this advertising? A great deal, that is true; but such advertising stops at just the vital point where light advertising steps in and closes up that business. Supposing a merchant spends hundreds of dollars advertising his special line of goods; he simply acquaints the public with the name of the article and the nature of the article, and in many cases induces the public to think that that special article is a wonder; but does the merchant put the article on the market at this time, I say no. The retailer does that regardless of all the other expensive advertising done by the wholesaler or even the retailers, the article goes on the market and is sold to the public from the lighted stores. Just consider for a moment sitting in your house reading a newspaper, you glance at the advertisement of some particular article advertising some special article that you are about to purchase; they advertise this article very cheap, much cheaper than you could purchase the same article at another place; you put on your hat and start to go to this store that has so advertised. When you get on the street you arrive at a beautifully illuminated store, you see the same article that was advertised by the other merchant, in the window of this beautifully lighted store, at an advanced price of what the other merchant advertised to sell the same article for. What is the consequence? Just this: You enter that beautifully and attractively lighted store in the first place because the light has attracted you, in the second place, because the light in your opinion has made the article that you were about to purchase look brighter, fresher, and in fact more valuable to you than the same article would look in a poorly lighted store at a discount figure.

This example brings out the point that although the man may advertise in the newspaper and with circulars and many other ways he is simply assisting the man that lights up his store thoroughly, beautifully, and I may say, properly.

In conclusion the writer begs to say that in his opinion he is not in the smallest degree trespassing on any or all other kinds of advertising, but insists that without a thorough system of advertising with lights be attached to all of his other advertising, he is incomplete and will not be successful, because his method of advertising is an insufficient system.

The President—Mr. Glenn R. Chamberlain is engaged on other business and consequently cannot be present. We have put this paper off to the last, although one of the most important and best papers we have had at this meeting, in order that we might have the benefit of Mr. Butterworth reading it and carrying on the discussion.

GAS ADVERTISING.

The subject of advertising is such a broad and important one that I feel it rather presumptuous on my part to attempt a discussion of it that will be either new, interesting or of any value to the Association. Therefore, in deciding to accept our President's commission to write such a paper, I must frankly admit that in a great measure I was guided by a remark once made by Mr. Emerson McMillin to one of his lieutenants in the gas business: "If you don't know much about a subject, write a paper on it."

The word "advertising" has been defined by some of the more conservative members of the gas fraternity as "a way of spending a company's money foolishly," and undoubtedly much of the advertising that has been done could well be described in that way. However, in connection with that opinion, we must take account of the fact that the amount of money spent in America for advertising is estimated at about $1,000,000,000 a year, and we all know that wide-awake American manufacturers and merchants are spending very little money foolishly. We are, therefore, rather inclined to prefer the definition of the man with the more optimistic make-up, who, defining the word in a general way, says: "Advertising is a subtle, indefinable, but powerful force which enables the advertiser to create a demand for a given thing in the minds of the masses, or arouses the demand that is already there in latent form." Again, another prominent gas man, defining the word in its application to the gas business, has said: "Advertising is time or money expended to increase our business or interesting the public in the commodity which we have for sale, either by visual evidence or by oral, written or printed arguments." If correct, the latter definition you see gives me a pretty wide latitude in handling this subject, and I have, therefore, taken the liberty of associating with it methods which are not ordinarily considered as advertising, but which, nevertheless, should be conceded to be such, since they have proved to result, directly or indirectly, in "increasing a company's business." It is a safe statement to make, I think, that advertising, in our business at least, is not particularly effective unless, or I might more fairly say it is vastly more effective when it is followed up by intelligent personal solicitation. Many people are often half convinced from reading advertisements that the thing advertised is desirable, but the feeling can only be ripened into real desire by arguments, which can seldom be set forth in written or printed form in a sufficiently attractive way to bring the "prospect" to the office. In fact, the soliciting force and the advertising work of a company are so closely allied that it is difficult to see where one leaves off and the other begins, despite the apparently broad line dividing the two departments. Advertising may be indirect or direct solicitation, while solicitation may be direct solicitation or simply advertising.

Often you hear the question asked and earnestly debated pro and con by gas men: "Are solicitors and advertising necessary to a gas company?" or "Are they a profitable investment for a company?" I would answer these questions with another equally as sensible: "Is milk helpful to an infant?" And, of course, in speaking of advertising and soliciting methods, we mean intelligent methods, judiciously administered and energetically pushed; not the kind in use by men who believe "this was good enough for grandfather, so it ought to be good enough for me." Men in the business-getting end of the work must be constantly on the alert for new ideas. You can have no sympathy in this day and age of the business for the gas man who is like the old farmer who said that "hearing both sides of a question always confused him." We must look into the other fellow's ways of doing things and adopt them too, if they are better than our own.

We are all familiar with the type of gas man who thinks his town is loaded with gas to the saturation point, and no doubt many here have been humiliated though gratified to learn that in spite of the fact that the town is already "saturated," astonishing increases in the sales of appliances and gas are made each year over the preceding one. So, if we wish eventually to make the showing that we should, we must ourselves firmly believe and hammer the point into the mind of every employee of our respective companies that there is no such thing in the gas business as the "saturation point." By intelligently and perseveringly looking for them we can each year find more "prospects" for the sale of our product than ever before.

The man who handles the advertising and soliciting work of a company, in order to be successful, must be broad-gauged. He must keep a constant and thoughtful eye open for new uses for his product, as well as for new and effective ways for its publicity. He must know where certain methods would bring good results while others would fail. He must know something of salesmanship, something of the law of supply and demand, a great deal of human nature and the best methods of appealing to it; must have a vivid and instinctive sense of the power of repeated impression; must know something of the force of striking display, and make use of all this knowledge as a means to the end desired.

A gas company's stock-in-trade is "goodwill" and gas, and the successful sale of the latter depends on the quantity we have of the former. Corporations the country over are coming to realize more and more every day that, coupled with investment, energy and brains, there must be the "goodwill" of the public—that so vitally important factor in all branches of competitive business. The "goodwill" factor in the gas business is right here enlarged upon and made to appear the most important feature of the subject of advertising, because it unquestionably has fully as great an influence over the growth and success of the gas business as it has over the grocery business, the drygoods business, or other enterprises of a commercial nature, whose growth must depend on the patronage of the people of the community in which they are located. We all regret the tendency of the public at large during recent years to declare war against all corporations, and many of us

shake our heads, and with an injured look on our faces, say that we of the gas business, innocent corporations, must suffer with the guilty, *i. e.*, those corporations of greedy, grasping, "public-be-damned" natures, who are directly responsible for this feeling on the part of the public.

But let us look the question squarely in the face and inquire whether we have the *right* to assume this injured air. *Have* we done all in our power to prevent the seed of discontent from gaining a foothold in the soil of our local community? Let us be frank and admit that possibly without realizing it we have all more or less taken advantage of the somewhat monopolistic position we hold in our several communities to ignore the "goodwill" factor. I think many gas men are living in the last century in this respect and have not yet come to realize that we are not now living in the halcyon days of 10 or more years ago, when gas companies in general were looked upon by the public with something of respect, or at least considered worthy institutions and, to some extent, public benefactors. This was when there was little or no talk of "trusts" and municipal ownership of public utilities. The weather vane of public sentiment has unfortunately of late years been veering to another and less favorable quarter, and the feeling against all private corporations seems to be growing stronger daily. The desire for municipal ownership of public utilities seems to be in the air. The people at large appear to be going insane over the idea of operating, on public account, gas, electric, water and street railway properties, even though the privilege be a rather costly one. To illustrate this attitude of the public, I would quote a statement recently made by an alderman in a certain city in this State with reference to the local gas company: "I would do anything that I possibly could to injure that blank gas company!" When asked what his grievance was and if the company did not give good service, he replied that he had no complaint to make of the quality of the gas or the service rendered. In fact, he had no doubt that they furnished the best of service—he was simply "dead against" all corporations on general principles, and frankly said so. Of course, it is pretty hard to become friendly with a man so unreasonable as this, but inattention to his wants and indifferent service to the community in which he resides certainly would not tend to better conditions. We must admit that the time has passed, if it ever existed, when public service corporations can be in the least indifferent to consumers' complaints, whether these complaints be real or imaginary. Possibly *we* are somewhat to blame for this revulsion of feeling on the part of the public. Have we not all heretofore spent too small a portion of our time and energy in the cultivation of the goodwill of the business, which, as has been said before, in any ordinary mercantile business is so important a factor in its success? Have we been at all inclined to let the goodwill feature take care of itself? If so, let me ask, how long would a groceryman last in a community if he did not give the best of service and have courteous and painstaking employees? Are we as particular as we ought to be in the selection of employees for those positions which bring them in contact with the public? Do the officers of our several companies give this detail of the business enough personal attention, or do they carelessly remain ignorant of the fact that some misfit employee is every day multiplying enemies for the company by his "grouchy" manners or lack of tact, whether intentional or unintentional, in dealing with customers? Do we take the pains to properly inform each and every one of our employees who comes in contract with the public, whether he be an application clerk, salesman, collector, cashier or shop man, how vitally important it is that he be courtesy personified? Do we, by individual instruction and daily, weekly, monthly, or even yearly department meetings or mass meetings of all our employees, sufficiently drill our trouble men, fitters, meter readers, salesmen, collectors and other employees, in such things? Do they thoroughly understand that a job is not half done, even though it be a workmanlike job, if the workman's manner toward the customer has been such as to leave a single trace of dissatisfaction in the mind of that customer?

It is my opinion that the best advertising a gas company can have in the present period of the business is a satisfied consumer, a real friendly consumer—one who, when he hears the words "Gas Company," thinks of an association of fair minded business men, human beings like other merchants, who respect the rights of the public. We certainly do not want to be thought of in the way that "trusts" and large corporations are caricatured in the daily papers during a political campaign. Unquestionably the tactless and "grouchy" manner or the "you may take it or leave it" air exhibited by many ordinary office clerks has indirectly cost many corporations thousands of dollars through loss of business and incalculable harm through unfavorable public sentiment. It is undoubtedly also true that the gas company which has the goodwill of the public is the company that sells the most gas per capita and makes steady and satisfactory increases in its earnings from year to year. A satisfied consumer may be the lever by which a dozen others may be gained. It is an endless chain scheme.

The Grand Rapids Company has gained a reputation for selling considerable gas per capita, and if one should analyze the situation they would find that it is not because they are any more clever or have any more or better opportunities to dispose of their product, but their comparative success is largely due to the fact that a great deal of their energy for many years past has been spent in properly caring for the wants of consumers and in investigating and adjusting every complaint as soon as it showed its head. The following editorial from a recent number of the *Michigan Tradesman* will give some idea of how valuable to the Company this "goodwill" of the public is from an advertising standpoint:

"When a customer of the Grand Rapids Gas Light Company registers a complaint he is called upon instantly by two pleasant faced young men, who proceed to investigate the complaint and adjust the matter to the satisfaction of the customer. When a customer of the Grand Rapids Edison Company makes a complaint he receives a peremptory letter to call at the office and be convinced that he is wrong. The difference in the two systems is quite manifest—one corporation undertakes to cultivate the goodwill of the people, while the other proceeds on the 'public be damned' plan."

Anyone who is acquainted with the editor and owner of this paper knows that comment such as that could not be secured editorially for any amount of money unless he thoroughly believed the gas company deserving of the compliment. It is, to my mind, the best kind of advertising and counts more with the public than a hundred paid advertisements.

There ought to be no such thing in the gas business as a "Complaint Department," and if there is now such a sign in a company's office it ought ta be taken down at once and metaphorically hung over the door leading to the office of the management. The word "complaint" implies a grievance against the company's service or employees, and whether such grievances are real or imaginary they should come, and be gladly welcomed, to some officer of the company competent and with authority to promptly and properly dispose of the matter in a manner that will leave in the mind of the consumer a feeling of friendliness and respect for the company. I say complaints, whether real or imaginary, should be *gladly* received by the management, because if the feeling exists no one on earth has more cause to regret its existence, or more to lose if it remains, than the company itself. Therefore, the quicker they learn of it and adjust it, the better it will be for them. Do not, by a displeased look when you listen to their troubles, encourage the consumers to "tell them to the policeman," or still worse, to their neighbors. Let the customer feel, by your cheerfulness of manner, that complaints are so scarce in the gas business that his is a decided novelty. That will be the best and least expensive advertising you can do. When a gas man, even though his desk be crowded with work, cannot listen patiently to a consumer's grievances, no matter how trivial or disagreeable, and furnish a means of adjusting the trouble—when he cannot do this as courteously, and, outwardly at least, as gladly as though it were a matter of personal interest to him, he needs a vacation, and someone ought to insist upon his taking it, for he is certainly a detriment to the company while he is in that frame of mind.

Most so-called complaints that reach a gas company's office are merely consumer's troubles, for which the company is in no way to blame, and the occurrence of which is often beyond their control. So let us not unnecessarily assume the responsibility for these disagreeable incidents to the business by designating, and thus acknowledging them, to be "complaints" against our service. Get away from the word as much as possible. Don't have a "Complaint Department," or a "Complaint Window," or at least don't call it by that name, because it cannot but have an undesirable effect on consumers.

The experience of many gas companies has been that gas arc lamps and Welsbach lights, sold for use in the business section of any city, must be carefully inspected, cleaned and kept in order by a special department, known as a "Maintenance Department." Periodical inspections are made by competent men and often enough to insure the highest efficiency for the quantity of gas used. Usually a flat monthly rate per lamp is made the consumer for this service, and the charge ought to be low enough to get all lamps in the business section on the maintenance list. I know of no better advertising for a gas company—advertising that will have more weight with a prospective customer who may be wavering between the use of gas and some other form of lighting—than to be able to show him a line of stores brilliantly illuminated with well-kept lights, having clean glassware and well-filled mantles. The consumers themselves will not keep their lights properly cleaned and repaired, and it is better for the company to furnish the service, even at a slight loss, than to allow the consumer to attempt it.

Poor service sooner or later means competition, possibly municipal ownership; and it has been demonstrated beyond a fraction of a doubt that a well conducted "New Business Department," or "Commercial Department," through proper efforts to look after the wants of consumers, is the most effective insurance against competition. Besides being self-sustaining, it furnishes a means of increasing a company's revenue to a surprising degree. In Grand Rapids, where there are approximately 100,000 inhabitants and the Company's mains very nearly cover the entire city, we have found that satisfactory increases in gas sales are made by dividing the city into 8 districts and putting a competent man in charge of each district, who understands that he is responsible and is also given credit for the conditions in that district so far as the Company may be affected, and that all grievances of consumers are to be carefully adjusted or are to be reported to the office, if he cannot properly adjust them. Because of the broad nature of their work, and also because the term is a more dignified one and leaves a better impression with consumers, we call the men in the Commercial Department, "representatives" rather than "solicitors." Each representative has a residence as well as a business portion of the city to look after and, in addition to the 8 regular men there are 2 saleswomen in the office and two special representatives, one of whom works up and closes business to be had on new main extensions, and the other being an expert "trouble man," who stands ready to take care of any important "rush" matters that the manager of the department may refer to him, as well as to aid the regular representatives in closing difficult deals requiring help. All representatives are required to take a preliminary course in the practical shopman's line of work so that they may be familiar with the practical workings and adjustment of every burner, appliance and condition that may arise in their territories. Representatives are kept busy in the spring, summer and fall in securing additional business through the sale of gas burning appliances, and in winter a major portion of their work, aside from pushing the gas arc

lamp business, is to ascertain, by house-to-house canvassing, the gas conditions in consumers' and non-consumers' premises, personally adjusting or securing the adjustment of any burners that may be out of order, or in fact adjusting any annoying conditions that may be found, incidentally keeping an eye open for possible additional business. A representative must largely make his own prospects, and let it be borne in mind that there is a great difference between the man who must go out and secure business from the man who thinks he has no need for the commodity which the company has for sale and the emyloyee who stands behind the counter to do business with the customer who must and seeks to do business with the company. The Commercial Department ought to automatically keep the management informed as to conditions throughout the city as to the sentiment of the public. If any of the several employees—clerks, trouble men, collectors, etc.—who come in contact with the public, treat it in an arbitrary or improper manner there will be complaints from the representatives that their efforts are being handicapped by the improper conduct of other employees, because the representative soon finds that he cannot do business with the people in his district if consumers do not feel friendly toward the company.

Following a plan in use by the Denver Gas and Electric Company, we have for some time been holding half hour morning meetings of all members of the Commercial Department, presided over by the Department Manager. Instructions are given, experiences are exchanged, friendly rivalry for best results is encouraged. The President and General Manager, Secretary and other officials of the company attend, and perfect harmony prevails. A stenographer prepares typewritten minutes of the important points brought out, which are bound in book form, indexed and kept for ready future reference. The meetings are not only inspiring and helpful to the employees, but are exceedingly beneficial to the Company.

Many will wonder what this all has to do with a paper on "Advertising," but we have found it to be the very best form of advertising, as it has secured to the Company an unlimited number of friends among that class of fair minded people who are not slow to say a good word for any company that considers it a calamity to have a single dissatisfied consumer on its books.

Now, referring to the methods known as written or printed advertising. Very often you hear the question asked, "What method of advertising is the most effective?" It is a hard question to answer, and depends considerably on local conditions and how closely and in what manner the business has been developed in the past. Methods that might be adopted with profit in one city because new to it might prove a flat failure in another because old and worn out. In this connection it might be well to note that a somewhat inferior method intelligently and energetically pushed will often produce much better results than an excellent method indifferently applied.

Regarding the question as to the best kind of advertising, I am reminded of the experience of the advertising agent for the *Farmers' Fireside Companion*, who once had the temerity to approach Dr. Blank, the great pill manufacturer, himself somewhat of a dyspeptic, for a liberal advertising contract. The Doctor glanced a moment through the sample copy, threw it to the floor, and said most emphatically: "That advertising would do me no good. Why, I wouldn't waste my time reading such a paper!" The agent smiled and said confidentially: "To be equally frank with you, Doctor, I wouldn't dare take one of your pills, but remember that 137,000 people *do* buy and read my paper and they are just the kind of people who will buy your pills." The Doctor saw the point and signed up for a half page. The incident teaches two things: (1) That the prospective customer who hollers "No!" the loudest when first approached is often the most profitable and satisfactory one when you do land him, because he thereafter "sticketh closer than a brother" and cannot be easily coaxed off by your competitor; (2) it shows that none of us should be entirely guided in our choice of advertising methods or the purchase of goods for sale to the general public by our personal feelings, tastes, likes or dislikes. We must carefully analyze conditions and find out what people want, or we will not be able to interest more than a very small portion of our prospective purchasers. Nor will any one method land them all. An advertisement for a $9 house piping proposition, to include all expenses for piping, labor, fixtures and glassware, would not be worded or handled in the same manner that would be effective for an expensive line of art glass reading lamps. The people to be reached in the two cases are not in the same circumstances as regards wealth, and possibly education, and are not looking for the same proposition. The value of a certain method of advertising may depend on the nature of the thing to be advertised. For instance, one of the cheapest and most effective ways for promoting the sale of coke is by means of short, readable advertising stickers, pasted on the face of gas bills. It is evident, however, that our energy would be wasted if we should attempt to secure entirely new gas consumers by such a method.

Street car advertising might be very effective in Detroit, because of the up-to-date service and good, well patronized cars of the Company, but might be useless in Podunk for the opposite reason. Generally speaking, newspapers furnish the best means of reaching the masses, but there are certain kinds of business, for instance the big industrial fuel prospects, which could not be reached as effectively and inexpensively through that method as by some more direct method. The prospects for gas engines are comparatively limited in number. There may be in a certain city 100 prospects for them, and a personal letter is, in that case, the thing to use, followed up by the personal work of the representative. If there were 1,000 or more prospects they might best be reached by the newspapers.

How much better it would be for us if we could devise schemes for inducing present consumers to use more gas, or gas for many different purposes. Such increased sales require no further investment on our part in mains, services, meters and connections. An important thing is to popularize the gas range for winter use. Educate the people to realize that there is no "season" for gas ranges, but that,

"In winter they are just as fine
As in the good old summer time."

A consumer who uses his gas range in winter as well as in summer is a better one for us than 2 consumers who only use their ranges in the summer, because the company's investment is smaller in the first case, while the consumption is as great as the latter two combined. Do some missionary work among the architects and furnace men and see that all new houses during the process of construction are provided with a hot air pipe, steam or hot water radiator from the basement furnace to the kitchen, so that the kitchen will not have to depend on the wood or coal cook stove to warm it in the winter. Have the representatives watch carefully all new buildings to see that gas pipes to gas grates, gas ranges, fixtures, circulating water heaters, porch lights, basement lights, etc., are on the architects' plans, and further see that all piping is of the proper size. The owner will always appreciate suggestions of this nature if properly presented to him.

The people we try to reach by our advertising methods are all busily engaged in their own affairs, and it often takes a long time for the point to hit the mark. Money, therefore, spent on solicitors or in advertising may not bring returns for a long time, but if you keep after it intelligently and long enough you will surely bring the money back with liberal interest.

The character of the argument, the quality of the matter, the method of displaying it, all have to be considered by the advertising man because he has many classes of customers to appeal to, and no one argument or method will catch them all. He has the busy man who will not read the long argument, the person who is prejudiced or misinformed, the one who is entirely ignorant of the problem, and also those who need only a reminder to avail themselves of the proposition offered. Many prospects require an extreme degree of persistence and cleverness, or both, while to some a simple notice of where certain things can be purchased at a certain price is enough to bring them, as they probably desired the goods but did not know where to get them. Many prospects require considerable argument before they will buy, but arguments in an advertisement are of no avail unless they are read, and the advertising man must study to display the matter in a manner that will insure its being read, at the same time being careful that the effort put forth to make it catchy does not spoil the effectiveness of the argument. Cuts may be made very helpful in displaying an advertisement by drawing the attention to the subject matter, but care should be taken that they are appropriate, that is, have some relation to the subject and are not simply put in to fill up the space. It's a pity, too, to have your attention drawn to an advertisement by the force of an attractive cut, only to find coupled with it uninteresting and useless printed matter. Such ads. remind one of the man who asked: "Don't you think my beard improves my looks?" "Yes, I do," answered a friend, "because it covers up most of your face!"

Because of the fact that most newspaper advertisers crowd into a a given space all the matter possible, thus making a black looking page, I believe that a very effective method, when very good cuts are not available (and good cuts cost considerable money), is to use liberal white space around the printed matter or the subject of the advertisement, also being careful not to use over 2 or 3 sizes of type. Such ads will instantly attract attention on any newspaper page. A few sample advertisements of this character are given herewith, and you can easily demonstrate their effectiveness by inserting them in your local paper, set up as they are given here.

Street car advertising acts on passengers in a more or less compulsory way. It cannot be escaped, especially when one is a constant daily patron of the road. It is, therefore, a valuable auxiliary to any other form of advertising. A story, however, which requires more or less detail in telling it, cannot be successfully handled in street cars. Such matter can only be exploited satisfactorily in newspapers, pamphlets and mail advertising. That street car advertising is very effective is shown by the fact that the bare advertising privilege covering a period of 5 years in the New York subway trains, using approximately 2,000 cars, was a short time ago awarded to Ward & Gow for $1,000,000. Each car contains 42 cards on the sides, with end space in addition, and the average charge to advertisers is about 60 cents per month. Ward & Gow also control the advertising privilege on the Manhattan elevated lines, as well as the elevated station news stands, so that from past experience they know that no great difficulty will be encountered in sub-letting the space to advertisers equally alive to the fact that each year over 1,350,000,000 fares are handled by the New York city railway lines.

I realize that too much of your time has been taken up with this paper, and I will close by quoting a sentence I recently read, which contains words of encouragement to the progressive gas man:

"The man who studies mankind and ascertains what men really want, and then supplies them with this, whether it be an Idea or a Thing, is the man who is crowned with honor and clothed with riches."

Sample Display Advertisements.

Be good to Yourself and your Bank Account!

A saving of over 25 per cent. on your fuel bill isn't to be sneezed at, is it? That's what Genuine Gas Coke does for you. The best fuel on earth for furnaces. GAS COMPANY, cor. Pearl and Ottawa Sts.

Keep Your Wife at Home these Hot Days!

Because if she should happen in at the Gas Company's office she could not resist buying one of our cool, comfortable Gas Ranges. You know they are sold on monthly payments of $2 and connected free. GAS COMPANY, cor. Ottawa and Pearl Streets.

Let Papa Try It!

Let him take charge of the kitchen and cook two or three meals, with the old wood stove, this hot weather.

Don't Listen

at the keyhole to what he says under his breath. You'll need only to remind him that a Gas Range will make the kitchen the pleasantest room in the house. Ask for an elevated-oven Range.
GAS COMPANY, cor. Pearl and Ottawa Streets.

A WORD TO THE WIVES IS SUFFICIENT.

Get a Gas Range.
Furthermore, get an elevated-oven Gas Range.
Insist on having a broiling as well as a baking oven.
Gas Cooking is the modern way—keep up with the times!
GAS COMPANY, cor. Ottawa and Pearl streets.

For a Happy Summer

WIVES NEED
as much relief as possible from the heat and drudgery of cooking.
HUSBANDS
need well-cooked, appetizing meals; therefore every home needs a Gas Range. Our salesrooms are open Saturday evenings during June. GAS COMPANY, cor. Ottawa and Pearl Streets.

It's what you Save that Makes you Rich!

Here's the route—For every $10-bill you plan on spending for hard coal, $2.50 of it can be saved by buying Genuine Gas Coke. Same number of heat units, too. Think it over!
GAS COMPANY, cor. Pearl and Ottawa Streets.

GASWATERHEATER.

No prize is offered for pronouncing the word—but everybody who buys the "Circulating" kind will prize it for its convenience, cheapness and efficiency. Just think—30 gallons of hot water in 30 minutes for 3 cents' worth of gas, or a less quantity proportionately cheap. GAS COMPANY, cor. Ottawa and Pearl Streets.

Discussion.

The President—I do not think it is any detraction from any other paper to say that this is, probably, in one sense, the most important subject that has been brought before our Association; in this sense, that you may make your gas by the most improved method, and have it of the highest quality, but if you do not get out and sell it, it is not much good to you. At the same time the man who is making the gas in the works is advertising the company's business, because if he does not make good gas, it will be heard from in the office, and will distinctly hurt the business. I do not believe that there is a man in any capacity in the employ of a gas company who is not distinctly responsible for its advertising and he advertises it for good or bad. We are to be congratulated that Mr. Chamberlain treated the subject in such a broad light. He makes apologies for taking up our time. I think a good deal more of our time could have been taken up in the same intelligent manner. I do not think in this discussion that I shall call on anybody to discuss it. I think everybody in the room should have some ideas, and be willing to express them, as helpful to the business. I think we ought to go right down the line. Mr. Knight.

Mr. Knight—I consider this paper one of the best I have ever heard read on the subject. I do not believe I want to take up any time in discussing it in detail. It is all true and it is all right. Mr. Chamberlain has covered the subject more fully and in detail than any paper I remember, and in a broad way. I think I can understand now how it is that Grand Rapids sells so much gas. They have some people up there who seem to be good advertisers. I have not any new ideas to suggest. I do not see how anything can be added to it; but probably there are some who have had experiences in particular styles of advertising, that will be very valuable to us, and I hope that those who have will speak out. I know how difficult it is to get up here. I cannot make a speech and everybody knows it, but I find that I am doing so, or trying to, at least. I guess I won't try to say anything more about this.

The President—Do not forget that the two previous papers are included in this discussion, Mr. Knight.

Mr. Knight—I know that they are both good. I had to read Mr. Mason's paper two or three times in order to understand it—I did not quite catch on at first—but I think it is a good paper. It would be a little embarrassing for me to say anything about the other.

Mr. Schwarm—Mr. President, I cannot offer anything but praise for this paper. I think it is one of the best I have ever had the pleasure to read on the subject. In connection with the matter of outside arc lighting, discussed by the previous paper, I think he deserves a great deal of credit for the manner in which he has carried it out. I think the Association should have that paper printed and a copy mailed to each member. I should be glad for a copy of it myself.

The President—Both of those other papers will be printed.

Mr. Wolff—I am very much delighted with this paper, because Mr. Chamberlain wrote to me two or three times and I had one conversation with him. He seemed to doubt his ability to present anything that would be of value to the Assoctation. He has certainly given us a good paper and one that has covered the ground in fine shape.

The President—Mr. Wright, do you know how to increase a company's business by advertising?

Mr. Wright—I am afraid my button is lost, and I am not a member.

The President—That settles you. One more new member.

Mr. Lathrop—He is afraid of butting in.

The President—Mr. Frazer, you have given a little attention to advertising?

Mr. Frazer—I have nothing new to say.

The President—Nothing new from Battle Creek. How about the pure food products, don't they give any inspiration, Mr. Ritter?

Mr. Ritter—I will give the same excuse that Mr. Wright gave, while I am a member of the Association, I have lost my button.

Mr. Ewing—On the first paper I really would like some consensus of opinion, because the Detroit City Gas Company has been criticized by a good many gas men for the method that it has adopted for hanging outside arcs. I think a good many of the gas men in Michigan think that we are going to have enough trouble this coming winter to get any profit, or possibly more than the gross receipts or cost, in taking care of those lamps. I really would like to have an opinion as to why that kind of piping won't stand any kind of weather. Mr. Mason's paper I think is an example of enthusiasm, but I don't think that he has studied the advertising question from anything but an enthusiastic standpoint. He has made statements there that I cannot very well agree with him at all. I do some advertising for the Detroit City Gas Company, and I don't know how we would sell our lamps unless we had some other means of advertising them, other than putting them up. You have to advertise them some way to get them up, and I believe there are lots of good ways to advertise, other than light, not but what light is a mighty good way to advertise, because I think I have shown in Detroit that I believe in light for advertising. In Mr. Chamberlain's paper he has covered it in a very broad sense, and it appeals to me in this way, that he is simply demonstrating to the advertising man that it is absolutely necessary to start right in the office. You cannot expect to spend a volume of money in any kind of advertising and obtain results unless you have got the goods to deliver. I think Mr. Butterworth will agree with me, when we started a campaign a few years ago on the coke question, that it didn't make any difference how much money we spent in advertising, if we did not deliver the kind of goods we were talking about; and we had a lot of trouble. So I think the first essential in advertising is to start with the office and be able to deliver the public exactly what you are talking about. If you tell a man he can get the best results for the least money, I think you have to do it. Mr. Chamberlain speaks about advertising, and says that he believes that the advertisements should have plenty of white space about them. I believe just the opposite. I would rather have an inch of black around it than an inch of white; and I think I will have a great deal more trouble in buying black than I will white. The papers in the city of Detroit won't give you a border of ⅛ inch unless it is in cut form. I just give you that to show you why I would rather have black than white. You can buy all the white space you want. Street car advertising, I believe, is good advertising. I think a little of it is a mighty good thing, and as far as forcing advertising among the public, I do not think it is more forcing upon the public than an advertisement in the daily newspapers. To-day the woman who is going to shop scans the papers to find out what she will buy; she intentionally reads the advertisements. A man who is sitting in the street car intentionally reads the cars to find what the people are doing and what they have to sell. I have heard more from adverse criticism of street car advertising, but I think a little of it is a good thing.

The President—I might say in regard to prospective trouble that I was in Minneapolis last winter, and while the outside arc itself had not developed to such an extent, arcs in cold places were taken care of all right by using dehydrators, each one of the boxes being filled with dry lime, and for ordinary climates, Mr. Shepard, the Superintendent there, was of the opinion that a large pipe would accomplish all that was necessary, and the frost and naphthaline would crystallize on the pipe, still leaving sufficient passage for the gas, and would not be stopped up before the naphthaline would be dissolved and carried on through the burner.

A Member—That is frost?

The President—Yes. I think it is more likely frost than anything else.

Mr. Freese—I do not think I can add anything more. My experience has been that if you enlarge the pipe at the point where the warm and cold air meet to 4 or 5 times the size of the regular pipe you will have no trouble. I had some experience with outdoor lights at Laporte, Ind., that we put up on brackets, and I ran the pipe down the inside of the building and attached to a 1½-inch pipe. That formed a bracket for the

lamp and they never gave a bit of trouble after that, but before that we had trouble every night on account of frost. Otherwise I should say it was a very good paper.

Mr. Blower—I have not any suggestions to make to this paper on advertising. I do not feel confident to add anything to that. However, speaking of outside lamps, in the winter of 1903 we had a number of old-fashioned Humphrey lamps and put them on lamp posts, and they were put up on two or three blocks in Kalamazoo. They were attached to ordinary lamp posts by goose-neck ¾-inch pipe without any further protection, and they stood out there all the winter. Sometimes we let them burn a few hours in the evening, and other times we let them burn all night, in all kinds of weather, and we had mighty little trouble in their freezing up. I don't think in the winter time more than four of them froze. It seems to me with an enlarged pipe, with the improved method of installing these outside lights, there should not be very much trouble in keeping them going all the winter. I rather think that it is a mistake to light up a whole block, covering several stores, with a continuous service pipe, or continuous pipe light, without reinforcing it from each store. It seems to me there is more chance of trouble in your riser if you put all your stores out of business; whereas, with a separate riser to each store, it is hardly possible that they would all freeze up at once, and you would only have an isolated case to attend to, and it would not be so noticeable.

A Member—I would like to ask Mr. Butterworth if it is necessary to send two men to answer a complaint. I see here he sends two men to answer a complaint.

Mr. Butterworth—Of course, we are not responsible for Mr. Stowes' statement in the *Michigan Tradesman;* but we do in case of a complaint of a serious nature—a difficult matter—send two men. Ordinarily in an urgent complaint we send two men.

A Member—I would like to ask Mr. Lathrop if the lights that are installed in one block are lighted every evening, so that the members of the Association can inspect them?

Mr. Lathrop—We expect they will be lighted 365 evenings for several years.

A Member—I was told they were not lighted last night.

Mr. Lathrop—At what time? They are supposed to be lighted until 11:30 this time of the year. This week it might have been let out a little earlier for your convenience.

The President—How about the Adrian Gas Company?

Mr. Wirt—Our plan in outside arc lighting is a little bit different from Detroit. There is a casing up to where the bullhead tee is. Ours just goes through the base of the window. We have a 1¼-inch riser in the larger plant. We had practically all of the inside light while the windows had electricity. We had to get around that some way, and of course the outside light was the only thing that appealed to us, and we made good headway with that. I like this paper here of Mr. Chamberlain's in satisfying complaints. I think we are all a little short on that. A woman will come in with something that to us is nothing, but to her is a great deal, and if fixed up satisfactorily to her she will go out and tell her neighbor, "Well, I knew there was something wrong, and they just fixed it up for me all right." I think that is one of the best means of advertising you can get. I would like to hear some opinion as to lighting both sides of a street in a small town. The thought occurred to me that you had better line up one side and keep them going, we will say, until 9 or 9:30; while if you undertake to light both sides, the man across the street will see how the other fellows' light shows on his side, and he has a tendency to cut his light out. I noticed in our town, one man who had light, as soon as we got it on a line of 17 on one side, he cut his right out entirely. I told him he ought to go over and divide with the other man on the expense. It didn't cost anything to light him; and it is an absolute fact they came and rubbered in his window just about as much as they did in the window of the man who had the light. I think it would have been fair for him to light it up a little. In thinking it over it occurred to me that instead of pushing the thing to a complete standstill and having everybody have them at a great deal more expense, to have a line on one side of the street doing business every minute rather than to increase the expense and have them crippled. You take it in a town, under 30,000, people have an idea that 9 o'clock is roosting time, and all go home, and we have to fight that proposition pretty hard, to get it in their heads that after 9:30 their window can still be doing business, because if it is worth 10 cents an hour in the daytime, it should be worth 30 cents at night to have their windows displayed. I think we have that pretty well established, and we have not had a great deal of trouble; but I don't know what any of the rest of you think about putting lights on both sides of the street. I would like to hear about that.

The President—I think that ought to be qualified by the explanation that Mr. Wirt is operating under a leasing system, in which the company owns the arcs. In Detroit, they sell them outright, the consumer owns them, the company only maintains. Those two systems probably have some modification.

Mr. Robinson—I have nothing to say except to remark that I enjoyed Mr. Chamberlain's paper very much indeed. I think where he speaks of looking after and treating the public in the best possible way, is something that every gas company ought to look into very thoroughly. That is, itself, a sort of advertising, and would be of great assistance. I enjoyed his paper very much.

Mr. Traver—About the only way is to make good gas, that is the only thing that is possible. Our works' men are as much in sympathy with this movement in Grand Rapids as the people in the commercial department, that is, each one of the works' men, except labor, are just as much in sympathy as the other people, and do as much work outside. They attend to the complaint work among their neighbors. We have got that spirit through the whole place, and it is really doing a great lot of good. That is about the only way I can see we can do.

The President—Do the works' men have a representative on this commercial board, so to speak, or meetings every morning?

Mr. Traver—Oh, no.

Mr. Butterworth—But each one meets with the department himself.

The President—Outside of this the men in the works do not attend this commercial meeting?

Mr. Traver—Oh, no; but the commercial men visit the work quite often, and most of the people are pretty well acquainted with each other, and they understand what this commercial department is for.

The President—In other words, you make the commercial man recognize gas when he sees it at the works.

Mr. Traver—Yes. The reason for that is to have those commercial men familiar with all departments and to find out how the gas is made, so that if anything comes up they can tell what is the matter; if the customer wants to know how coke is made they are perfectly capable of telling it to them. As the departments change, new men come in and others go out. They go down quite often and go over things so as not to get rusty on them.

Mr. Shacklette—Mr. Chamberlain says, do not have a complaint department, and do not have a complaint window. I would say, do not have a complaint form either. We have none, and we do not allow a clerk to use the word complaint in our office. We call it a trouble order, that is the word used by telephone companies; they are mostly trouble orders. Another thing, in connection with our outside arc light, which may bear some ridicule, we are turning our advertising space over partially to the people who are doing this outside lighting. For instance, at the head of our advertising: "Our designs cover all requirements of artificial illumination. Colors will not run together when lighted by the gas arc. See the magnificent display of statuary at Beck & Egan's furniture and crockery store, any evening. Gas Company." When you see anything in a gas lighted window you know it will look just the same in the daytime. Our principal object in that is, not to get more outside gas arc advertising, but to induce the man who sees that light down town to go and pipe his house for gas, and we are getting a great deal of business in that way. Over 10 per cent. of our customers that come in there and say, I want my house piped for gas. I saw it in such and such store, or such and such shop, and it is the best light I ever saw; can you fix my home up the same way? and we have piped 3 or 4 times as many houses this year as we did last.

Mr. Cantrell—Mr. President and gentlemen, I beg to say, in connection with Mr. Murray's paper, I think he should be complimented on preparing a paper at such short notice. Certainly there are some very instructive ideas in connection with it. I might say in Grand Rapids we are pushing the outside arc business very vigorously. We have about 176 outside arcs installed, 76 of which approximately are used only during the summer months, but the other 100 are used every night in the year. Probably within the last 6 weeks we have installed 88 outside arcs on the same lines as the Detroit Company installation is being made, with a large riser from 1¼ inch pipe to 2 and 2½ inches, and we do not anticipate any trouble this coming winter. I believe the outside arc business is a very profitable business to a gas company, and the installation as a rule requires no further investment on the part of mains, service and meters, and the revenue obtained from them, as I have found from experience, is much greater than the average gas range. I should say that our outside arcs bring in a revenue of $3 a month, the majority of them. We sell our outside arc lights and have no trouble in doing so. In connection with Mr. Chamberlain's paper, there is one point I wish to emphasize. He says that the representatives should know something about salesmanship. I believe that is a very important factor in that line of work. The representatives of the Grand Rapids Company are taking a course in the Shelton School of Scientific Salesmanship. We believe this helps to enthuse us and inspire us. There are some very good points contained in those lessons. We have not completed the course as yet, but we expect to in the near future. In regard to representatives taking care of complaints, I believe this is a very important feature connected with the gas business. You probably all have noticed that they gather around your order window, especially on discount days. There are probably 4 or 5 consumers who wish to register what you might call a complaint, and if one happens to be a very erratic sort of customer and loud-mouthed and talks about roobers and thieves and so on, it is apt to have some influence on the parties who are waiting there to receive service. Whereas, if their names and number can be taken down, and a representative sent to the house, it is a much more satisfactory way to adjust the complaint on the premises of the party who is making the complaint. I believe that is very important. Speaking of enthusiasm, we tried to have the commercial department come in contact with all other departments as much as possible. Mr. Traver brought out the point that we visit the works frequently and become acquainted with the manufacturing end of it as much as possible, but get some idea of it anyway. In fact, we tried to get the other departments enthused over this work, and I might mention a little incident which occurred a month ago with our office boy. He seems to be enthused and to have this enthusiasm instilled in him. It came about in this way: A telephone message came in there was such and such a person who would like to see somebody and make arrangements for a gas range. The young lady who took the message happened to tell the office boy about it. There was nobody in the office at the time to attend to it. The boy says, "Well, I will go down; I believe I can sell it." And, sure enough, he took the name, went down there and closed the deal. That only shows enthusiasm and the right spirit which we are trying to bring about.

Mr. Dewey—Speaking of outside arc lighting, Mr. Cobb asked me if

we had any experience with that method of casing the riser, and then running the main line pipe along the building for a number of arcs. Last winter we installed at Hudson's—or rather last fall I think it was—a line of 8 or 10 arcs. It may be possibly even a few less, but it was over 5, on the northeast side of the building, a place notoriously the coldest spot in Detroit, a place which the sun rarely ever strikes. We installed them according to the system outlined in the paper, and I do not believe that even a pilot light in the coldest weather went out. On the strength of that experience, we have gone ahead and installed a great number of outside arcs on the same principle. It may be in this installation we put in, in front of our office here, along the block there, in some cases it is defective. If it does fall down, I believe it will be on account of the peculiar conditions that you will find there. The different stores have different heights of windows. The awnings are all different, and we had to make a great many turns and bends and drops in that pipe, and we were unable to drip it all back to the riser. However, as Mr. Murray explained, we are putting in incased drops into the different basements of the stores where the low point is located. I believe we will overcome the difficulty that has been mentioned of having all the lights go out at once, because, as Mr. Murray indicated, we intend to have 5 different risers—3 or 5—and in the line of the experience that we had at Hudson's last year, I believe we are safe in going ahead on that principle of installation of the outside light. I am aware of the fact, if we fall down, we will fall down pretty hard, because we have put all our eggs in one basket. However, I know of no better system, and we have tried pretty nearly all of them, and nearly all of the other systems have failed. Speaking of the system tried in Kalamazoo, of hanging lights on the lampposts, I should like to ask if the riser as it came up out of the ground in the inside of the lamppost wasn't larger than ¾ of an inch at the point where it came out of the ground?

Mr. Blower—No; a majority of them are ¾ inch. I think there may have been a few that were inch pipe when they turned up in the ground to run up through the lamp post.

Mr. Dewey—That is surprising, because in the light of the experience we had down at Fort Wayne, at the Army Post, where we did some outside work, we had it installed with a 1¼-inch riser that came out of the ground. It may not have been necessary, but we took that precaution. There is another thing that has probably never been noticed by most gas companies or gas men, and that is the depth to which frost will accumulate in a pipe. Mr. Brown, of Milwaukee, was relating to me an experiment which he conducted on a main pipe. I think it was an 8 inch pipe, which led over one of the bridges, supplying a certain portion of the town. He had that pipe tapped last winter or last fall to determine if possible the depth the frost would accumulate in that pipe, the maximum depth, and he found that the depth of freezing at the coldest time did not exceed ¾ of an inch. In other words, it seemed that the ¾-inch covering of frost on the inside practically insulated the pipe. We have found that experience in running the service pipe. Acting on that idea, where we go through an area way or exposed place, we are putting in large service from two and a half to three inches, figuring that there may be possibly ⅝ to ¾ of an inch frost. That will leave 1½-inch opening in the pipe. I believe that is the reason why we find that these large services do not freeze up, from the fact that the freezing of the naphthaline, or whatever it is, accumulates to a certain depth, and from that time on the gas is practically insulated, and no more frost will deposit. Another point. I saw in one or two of the discussions that the gentlemen used some large risers without incasing them. I think probably this will do as well as incasing the riser. Our object in bringing up the encasement was to introduce a portion of the warm air from the cellar and to keep it on the inside of the casement and outside of the riser. This was done to gradually chill the gas and conduct the moisture back to the basement. In this way, probably theoretically, we thought we would get better results and not destroy the illuminants of the gas in anyway; but either system I believe is equally satisfactory.

Mr. Cobb—I think that all of these 3 papers are full of good stuff, all the way through. There is just one thing in Mr. Chamberlain's paper that would lead me to believe that we, up in Saginaw and Bay City, are a little behind the times, and that is in the use of the word complaint. Now a complaint is a complaint, and you cannot make it anything else. The consumer comes into the office with a complaint or a kick. He has made up his mind he is going to register that kick, and he naturally looks around for a place to make it. Call it information bureau, and have a clerk as information man. He comes and asks him where he can register that complaint, and he says you can go down here or somewhere else. I don't see any reason why we should get away from the word complaint, because we all know we have any number. You can't get away from it. This is not at all in the nature of a criticism of the idea advanced, but I want a little more information as to why we should not use the word. Mr. Chamberlain says, "When a gas man, even though his desk be crowded with work, cannot listen patiently to a consumer's grievances no matter how trivial or disagreeable, and furnish a means of adjusting the trouble, when he cannot do this as courteously and, outwardly at least, as gladly as though it were a matter of personal interest to him, he needs a vacation." That is very nice, very nice indeed, but some years ago I should have taken that quite literally, and think we had been up against a little hard work. Indeed I think we would all take a vacation. It is easy enough to say we should adjust the complaint, but you cannot always do it unless you adjust it the way the consumer wants you to adjust it. If a man comes in and complains of the size of his gas bill, if you are willing to cut it in half, or a quarter, he naturally will be satisfied. I think that statement should be qualified, by saying, that you must use your best endeavor to adjust the complaint satisfactorily. Mr. Chamberlain says nothing about the use of card advertising or fancy advertising, which a great many of us have spent a good deal of money on, in the last few years. I don't whether Mr. Chamberlain or the Grand Rapids Company have given that up, or never went into it to any great extent. Personally I think it is one of the poorest forms of advertising; but I think that Mr. Chamberlain's idea of newspaper advertising, followed up by solicitors, brings better results than any other form.

The President—I don't know that I can agree with Mr. Cobb on the use of the word complaint. If you use a word which implies fault—a complaint. It is implying a fault you are establishing at once by an implied admission. It means there must be cause for complaint or you would not have a place where complaints can be registered. A consumer will come in with a complaint, and it is possible that you apply a wrong term to what he is bringing into the office. It may not properly be a complaint, and would not be a complaint if he understood what he was talking about. It is a trouble. I myself never countenance the use of the word complaint, and I won't have it around. I don't like to feel I have any complaint, and I do not want one around the office. What do you think about it, Mr. Lathrop?

Mr. Lathrop—Some time ago I abandoned the use of the word complaint in our office for the reason you mention. We do not like to make prominent to the people the fact that we do have complaints. I think all these papers are very valuable, and I think that one of Mr. Chamberlain's is especially valuable in the ideas that he presents that we should make friends with the customers in every way possible. In regard to the action of the outside arc lamps causing trouble in the winter, I do not think that we need anticipate very much trouble from them. When I was up in the northwest we had about 2,600 gas street lamps going, equipped with Welsbach burners, and the thermometer used to get away down as low as it could—got down to 40 odd degrees below zero, and the frost used to get into the ground a good many feet, and while we did have some trouble with those lamps, we did not have very much, and I do not see why you should anticipate a greater proportion of trouble here than we had up there.

The President—As the time is getting limited, and getting towards the hour of adjournment, I would ask is there anything further to be added?

The Secretary—I would just like to say a word for Mr. Mason's paper. I think some of the gentlemen who spoke in regard to it got the wrong meaning of the paper. To me it does not mean the means of advertising gas, but gas is the means of advertising other things, as a type; and it seems to me it is the pithiest and most concisely written thing I ever saw.

The President—I think Mr. Mason's paper is a prime argument to use to the man to whom you want to sell an arc lamp. As such it might very well be distributed. I am only sorry that our friend Mr. Frost has just left, because he has quite a problem on hand in Delray. An old Frenchman came in there and asked him what the price of gas was, and he answered, $1.25 per 1,000 feet. He threw up his hands and says, "Well, I can't take it; I live 5 miles away. (Laughter.) I want to make an announcement. Mr. Douglas has said that it will be wholly impossible for him to serve the Association another year as Secretary and Treasurer. For a number of years past the Michigan Association has very nearly been Mr. Douglas. I think the growth of the Association has really been wrapped up in Mr. Douglas; he has given it most thorough and unselfish attention, and I think what we are to-day really in a very large measure is owing to the personal, unselfish effort of Mr. Douglas.

Report of Nominating Committee.

To the Members of the Michigan Gas Association: The Committee on Nominations recommend the following officers be elected for the ensuing year: *President*, W. H. Barthold; *Vice-President*, V. F. Dewey; *Secretary and Treasurer*, A. P. Ewing.

B. C. Robinson,
H. C. Morris,
W. H. Loutit,
} Committee.

The President—You have heard the report of the Nominating Committee. I believe that it is in order, before moving the adoption of such a report, to ask if there are any other nominations. (Report adopted.)

Mr. Wolff—I think we ought to hear from the new President.

Mr. Barthold—Fellow members, this is indeed a great honor. I appreciate it, and trust that I will be worthy of the honor and thank you very much. (Applause.)

The President—We want to hear from our Vice-President.

Mr. Dewey—Mr. Chairman, I certainly appreciate the honor. It is entirely unmerited, having been in the Association so short a time. I hope the honor will not be too heavy. I thank you very much.

Mr. Wolff—Before we adjourn I think it well to tender Mr. Douglas a vote of thanks for his very creditable work in the past seven or eight years, and the remarks made by the President are most appropriate.

The President—It certainly gives me a great deal of pleasure to put that vote of thanks. We won't call for a seconder. All those in favor, please rise.

The Secretary—I just simply want to tell you how much I appreciate the kind words that have been said, and how much I appreciate the the work of being Secretary of this Association. It has been one of the most pleasant jobs I ever had, and it was with a great deal of regret that I found that I would be compelled to give it up. The work for the past four or five years has been particularly pleasant, because the only disagreeable part of getting papers in line for the meetings has been performed by the Presidents, and I want to thank all of them particularly for this great assistance which they have given me. (Applause.)

The President—Is the Committee on Next Place of Meeting ready to report, Mr. Ewing?

REPORT OF COMMITTEE ON NEXT PLACE OF MAETING.

Mr. President and Gentlemen: Your Committee on Place recommend that the next meeting of the Michigan Gas Association be held the second week in September, 1906, in Grand Rapids, Mich.

ALONZO P. EWING,
JOHN HELLEN,
A. L. ZWISLER, } Committee.

The Secretary presented the following statement regarding the

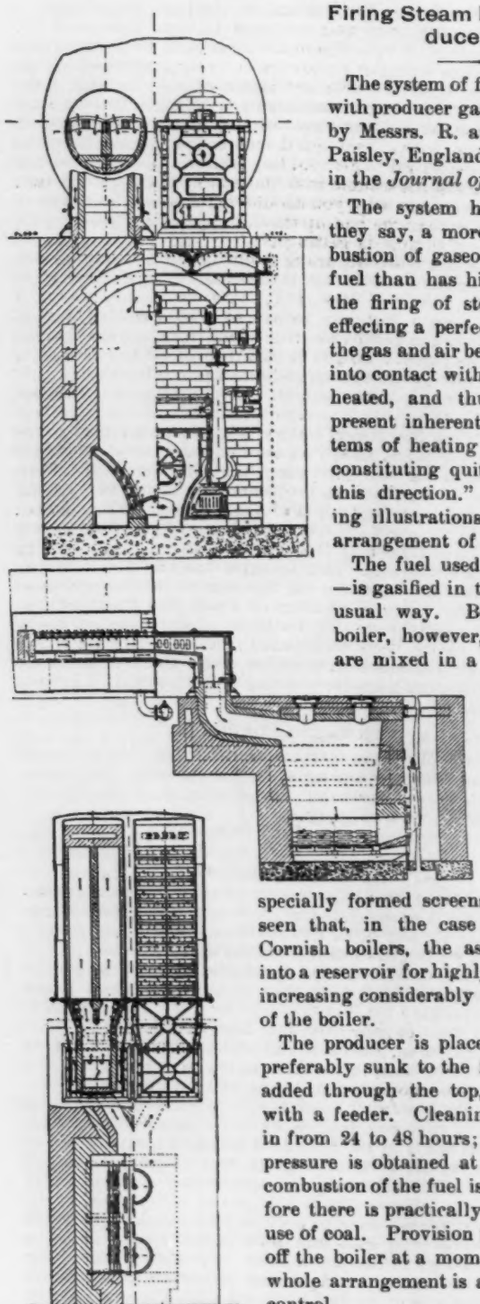
SCHOLARSHIP FUND,

after which the convention adjourned:

On hand at last report	$1,352.81	
Subscriptions paid during year	105.00	
		$1,457.81
Paid to the University of Michigan		600.00
Now on hand		$857.81
Subscriptions unpaid	$85.00	

Firing Steam Boilers by Producer Gas.

The system of firing steam boilers with producer gas recently patented by Messrs. R. and G. Hislop, of Paisley, England, is thus described in the *Journal of Gas Lighting:*



The system has for its object, they say, a more economical combustion of gaseous liquid, or solid fuel than has hitherto obtained in the firing of steam boilers, "by effecting a perfect commingling of the gas and air before being brought into contact with the surfaces to be heated, and thus remedying the present inherent defect in all systems of heating steam boilers and constituting quite a revolution in this direction." The accompanying illustrations show the general arrangement of the producers, etc.

The fuel used—gas coke or coal—is gasified in the producer in the usual way. Before entering the boiler, however, the gases and air are mixed in a chamber or chambers in front of the boiler, and from which they pass into the combustion chamber placed inside the boiler flue or flues and thence through some specially formed screens. It will thus be seen that, in the case of Lancashire or Cornish boilers, the ash pit is converted into a reservoir for highly heated gases, thus increasing considerably the heating surface of the boiler.

The producer is placed in front, and is preferably sunk to the floor level. Fuel is added through the top, either in bulk or with a feeder. Cleaning is necessary once in from 24 to 48 hours; and a steady steam pressure is obtained at all times. Perfect combustion of the fuel is effected; and therefore there is practically no smoke with the use of coal. Provision is made for shutting off the boiler at a moment's notice, and the whole arrangement is always under perfect control.

Installations erected are said to be effecting a saving of 25 per cent. in evaporation per pound of fuel, and at the same time giving 25 per cent. more water evaporated per hour as compared with hand fires. The producer, mixing boxes, and screens are found to be most durable, and therefore the upkeep is a small item.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, October 10th, 1905.

Electricity at Olympia.—Lead Wool.—Cheap Gas.—Supply Pressure.

The success of the Earls' Court gas exhibition has attracted attention in various quarters. The chairmen and directors of our principal provincial towns did not overlook the advantages of advertising gas and gas appliances, or the fact that the show was attended from first to last by crowds of the well-to-do public, including both present and prospective consumers, and that none of the exhibitors regretted the heavy expense entailed, but one and all agreed that the returns in the way of sales were sufficiently remunerative. Exhibitions of a similar character, but, of course, on a smaller scale, are being held in large towns at a distance too far from the metropolis to admit of the Earls' Court exhibition proving a direct attraction to any important proportion of the customers. One is now in progress at Newcastle-on-Tyne; another is to be opened in a few days at Newport, Monmouth; and there are more to follow. We may expect that something will be heard beyond our own shores as the result of the impressions gathered by the large number of colonial and foreign visitors. It is also natural that the results should not escape observation in other branches of trade, and it is a compliment to the enterprise and business acumen of the promoters of the Earls' Court exhibition to find that electricians have followed with one on similar lines, engaging the same organizers and exactly following the procedure as regards the opening and as to the attractions afforded. They have also evidently taken account of the discussions and criticisms that were offered in the technical press and have avoided some of the mistakes in connection with the former event. They have secured a spacious and lofty building known as "Olympia," which is much better adapted for such a purpose than the irregular and widely dispersed groups of buildings at Earls' Court. But with all that, they have not succeeded in attracting the public attention to anything like a corresponding degree.

The reason of this is not far to seek. In regard to gas it was admitted that very little had been done in the way of canvassing for new business. The majority of gas undertakings have been satisfied with what is called the natural growth, and some have not even troubled to keep up to that. Such a statement is not complimentary to the enterprise of those responsible for the well being of the gas industry, but it is a fair presentment of fact. Some 30 years ago I wrote a series of articles commenting on the utter absence of anything like a selling department in the gas industry and comparing its attitude towards new business with that usual in other trades, but it is only lately that the necessity has in a general way become apparent. The Earls' Court exhibition was to some extent a recognition of that important fact, and many of the visitors had never been asked to use gas or approached in any way. It was a novelty to have the advantages of burners and stoves explained to them. Electricians have gone to the other extreme. They have recognized that electricity would not sell itself as gas does, and from the first the commercial department and the energetic canvasser have been as principal planks in their business platform. The consequence is that the general public have heard quite as much as they wish to know about electricity and perhaps more. They take no more interest in ohms and amperes than they do in the constituents of coal gas, and the promise of scientific lectures by some of the best authorities attracts very few outside the circle of young men who are "improving" in the profession. There is nothing in the way of quick cookery and other features that aroused so much interest at Earls' Court, and although some attempt is made to cook and to heat by means of electricity, its use for these purposes is outside practical politics so far as the general public is concerned. Only an electrical crank would be likely to pay £3 for a kettle or £20 for a cooking range. An amusing feature in the exhibition is the presence here and there of clusters of gas burners that are decidedly not of the newest or latest pattern or in the best possible state of repair. This is quite in keeping with the usual practice. When making comparisons between electricity and gas, while care is taken to secure the latest and best results afforded by a brand new lamp in the case of electricity, the same solicitude is not extended to gas, and perhaps the badly worn and dilapidated gas burners at Olympia are intended as specimens of those used by electricians when they conduct experiments on the relative cost of electricity and gas. The fact that the "awful example" is not wanting at Olympia should encourage vendors of gas to see that

their customers are adequately informed on the matter of gas burners, and by taking up the subject of maintenance to insure that several examples of properly equipped gas burners are to be seen in the district. An efficiently maintained hall, place of worship or large store is the best advertisement, and gas companies who properly appreciate this point will find that their lighting business does not go back.

An important advance in the matter of pipe laying is reported from Germany. If it proves in practice to realize all that is claimed for it, the fire basket, pot and ladle, will become a thing of the past. This means a saving both in fuel and labor, the avoidance of all the smoke, fumes and risks incidental to melting down the metal and transferring it, while in a fluid state, to the joint. There will be no risk of burns from melted lead, or from spurting caused by damp pipes. Lead always contracts in cooling, and hence the necessity for setting up after pouring, and even the most skillful caulking cannot do more than make a sound surface joint. But the German firm have hit upon a process for preparing lead in a finely divided form, to which they have given the name of "lead wool." It is shredded into such fine shavings that it can be twisted like spun yarn, and in that form is treated exactly the same way, being caulked into the joint in successive small quantities. There is no wasting for the metal to melt, no loss by oxidizing, and the operator is independent of weather or damp. Obviously a joint made in this manner is homogeneous and solid right from the bottom, and the system is especially convenient for pipes of large diameter. The cost of lead wool is of course greater than that of pig lead, but it is claimed to be cheaper in the end, as 2 pounds of wool will go as far as 3 pounds of pig. Exhaustive tests have been made, which prove that sound joints can be made, and also much stronger ones as regards resistance to bending strain. The disadvantages of ordinary lead joints are so well recognized that gas engineers have regarded wrought iron and steel tubes with favor, if for no other reason than that they afford a way of escape from them. But the advent of lead wool may mean an alteration in this respect, as the objections do not apply to it, and a joint can be as readily and conveniently caulked with lead wool as connected up by means of threads or bolts. It is not too much to say that lead wool looks like one of the most promising methods of reducing the unaccounted-for gas that have been put forward for a long time. The thickness of the caulked ring is 1 to 1¼ inches according to the diameter of the pipe, and the weight of wool required for a 12 inch joint is only 7¼ pounds. Lead applied in this manner should possess a certain degree of natural elasticity that is absent in a melted joint, which is or should be one solid block. The result of the difference in expansion due to change of temperature, in lead and in iron respectively, is the cause of many open and consequently leaky joints. Pipes under bridges and in other exposed places are continually a source of trouble on this account. But in a well set up joint of lead wool the numerous fine fibers should take care of this expansion and contraction between themselves, enabling the joint to remain perfectly sound.

The following story hails from Scotland: Two careful housewives were discussing domestic economy whilst travelling in an omnibus, and amongst other things the price of gas came on for consideration. One of the speakers said she owed a large bill for gas and found a difficulty in raising the money. The other advocated the use of a penny in the slot meter as being cheaper and more convenient. The convenience was admitted, but the cheapness disputed, a comparison between the ordinary and the slot rates being enumerated as a proof. But the second woman held her point, and on being pressed for an explanation, said that she frequently had visitors in the evenings, and that she took care not to put in more than one coin at a time. The result was that before supper time the gas would begin to go down, and then a difficulty arose about finding the necessary copper. When after a prolonged search it could not be found one of the visitors would oblige by supplying the deficiency. We have all heard of the mean individual who found that a missionary box placed in a prominent position on the hall table raised sufficient funds to pay the taxes, and the above is evidently a development of the same idea.

The Stevens law as lately introduced in New York for regulating the limits of pressure both maximum and minimum of the gas supply, reminds one that the state of the question in England is controlled by regulations of an obsolete and, as applied to modern conditions, of an absurd character, but fortunately they have not been directed to a maximum limit. I should suppose that the New York legislators have been impressed with the risks and dangers possible in case of excessive pressure. But that view of the question has never been prominent here. If any limit is imposed it is usually a minimum only. Most of the older acts stipulated not less than 6-tenths by day and 8-tenths in the evening taken at the inlet of the consumer's meter, and some merely provide that a sufficient pressure shall be maintained in the mains with no further particulars as to who is to determine or define a sufficient pressure. As regards the first named it is evidently based on the flat flame or batwing burner, and any close adherence to it would simply render atmospheric burners of any kind quite useless. And as regards the second there is nothing to prevent a consumer putting down some appliance requiring a pressure of 50 pounds per square inch and demanding a "sufficient" supply for it. The New York limits would not be possible in England, where the supply pressure has been more than doubled in the last 30 years. I can remember when 8 to 10-tenths at the works governor was considered a sufficient day pressure, and 20-tenths was the maximum in the evening. But now the requirements of the consumers are at least fifteen-tenths at the outlet of the meter, and that at all times of the day or night. So that the usual working is about 30-tenths from 6 A.M. till dusk, 40 to 45 tenths during the evening and 15-tenths from midnight to 6 A.M. A limit of 25-tenths on the leading outlet mains would mean utter failure over half the district, so it is to be hoped that such a grandmotherly regulation will not find its way across the Atlantic. And with the extended application of cooking stoves, gas fires and incandescent lights, the supply pressure will continue to increase. In many districts, for example, a full maximum pressure is required on Sundays from 11 to 1 o'clock when all the cooking stoves are in use, preparing the only hot dinner that many of the artisan and trading classes are able to get in the week.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. C. L. GEROULD has accepted a responsible position with the American Water Works and Guarantee Company, the main offices of which are in Pittsburgh, Pa. This Company controls several water and lighting plants, and its President is Mr. James S. Kuhn, whose record as a financier is of the solid sort.

MR. HENRY C. HAZZARD has been appointed Secretary of the New York State Commission of Gas and Electricity. Under the Low mayoralty administration he served as Secretary to the Police Commissioner. He is a lawyer, being the junior member of the firm of Thompson & Hazzard, Wall street. Mr. David N. Brice, of Albany, has been appointed "hearing" stenographer to the Commission.

THE proprietors of the Hartford City (Conn.) Gas Light Company have issued the following price reduction card, the rates thereon being declared effective on bills delivered the first prox.:

Quantity.							Billed at	Net Price.
500 cu. ft. or less; minimum charge.....							...0.55	0.50
600	"	to	10,000	cu. ft.,	minimum	charge...	1.10	1.00
10,100	"	"	50,000	"	"	"	...1.05	95
50,100	"	"	100,000	"	"	"	...1.00	90
100,100	"	"	250,000	"	"	"	... 95	85

The circular further explains that there is "A special consideration to larger users," and that, "the cash discount making the net price is 10 cents per 1,000 cubic feet on all bills paid before the 15th of the month following that in which the gas is used, providing all the previous indebtedness is paid."

AT the annual meeting of the shareholders in the Troy (N. Y.) Gas Company the Directors elected were: A. Bleecker Banks, A. E. Bonesteel, A. N. Brady, Thomas Breslin, C. E. Davenport, F. E. Draper, Jas. W. Fleming, George P. Ide, Wm. Kemp, Peter McCarthy, Francis J. Malloy, Edward Murphy, Jr., and R. C. Pruyn.

WE understand that the Northwestern Gas and Electric Company is to build the gas plant at North Yakima, Wash. The statement is made on the authority of Mr. R. E. Allen, Local Manager for the Northwestern Company, at Walla Walla, Wash.

MR. C. G. M. THOMAS, Vice-President and General Manager of the New York and Queens Gas Company, of Flushing, L. I., has made good his word to the residents of Bay Side that they should have gas this fall. The supply was turned on a fortnight ago.

MR. CHARLES C. MALTON, formerly in charge of the burner and stove department of the Worcester (Mass.) Gas Light Company has resigned that post to operate on his own account a handsomely fitted up shop for the display and sale of gas apparatus in the premises 509 Main street, Worcester.

THE *Gas World*, in editorial comment on the peculiarities of the Stevens' measure, making arbitrary regulation of the gas pressure that

may be maintained by the gas companies of New York city, remarks: "The Stevens' law, applied to the New York Gas Companies some months ago, will strike British gas engineers as very much behind the times, if not wholly absurd. Given a moderately level district, it is conceivably possible that the pressure in that district might be maintained at all points within the limits prescribed by the law; namely, 1 inch of water as a minimum and 2½ inches as a maximum. But the achievement would cost more in money and brain energy than it was ever likely to be worth to the gas consumers. There is absolutely no need for the restriction of the upper limit of pressure. The gas companies of New York may be trusted, as the gas companies are in this country, to maintain such a pressure as will best meet the average requirements of their districts; and even if they should fail to do this, the consumers have the remedy in their own hands, for by the manipulation of the taps, or by the application of a governor, each consumer can reduce excessive pressure to a working limit. Better surely that hundreds of consumers should have to reduce pressure than that thousands should be left bewailing the lack of a proper gas supply, as appears to be the case since the application of the Stevens' law in New York. A minimum pressure has long been prescribed by the English gas laws, and if any fault can be found with the minimum it is that it is too low—from 6-tenths to 10-tenths as a general rule—for these days of incandescent burners and gas cookers; but no attempt has ever been made to fix an upper limit. That is best left to the gas suppliers, as no doubt New York will speedily discover."

MR. C. F. CHISHOLM has been elected Superintendent of the Suburban Gas and Electric Company, of Revere, Mass.

THE City Council of Montreal, Canada, has appointed Messrs. W. H. Pearson, of the Consumers Gas Company, of Toronto, Francis Giron, of Montreal, and Ernest Belanger, of Montreal, as a board of experts to inform the Montreal authorities as to the advisability of the city engaging in the operation of a gas plant.

THE proprietors of the Worcester (Mass.) Gas Light Company, have notified the Board of Gas and Electric Light Commissioners that on January 1st the net selling rate will be put at 90 cents per 1,000 cubic feet. The gross rate will remain at $1.10 per 1,000, but the discount will be increased on prompt payment account from 10 cents to 20 cents per 1,000.

A CORRESPONDENT in Boston incloses the following under date of the 21st inst.: "At a meeting of the Malden and Melrose (Mass.) Gas Light Company, held some days ago, the entire stock of the Company was sold to a syndicate representing the Malden Electric Company, which will consolidate the Companies. The capital stock of the Company is estimated at $607,500 and the price paid was $250 per share, the market value being about $150. President F. E. Chandler owned 780 shares and Hildreth Bros., of Cambridge, 850 shares. The Directors of the new Company are also Directors in the Springfield Gas Company and in the Malden Electric Company. They are A. B. Tenney, Brookline; E. A. Hildreth, Cambridge; F. P. Royce, Dedham; C. H. Tenney, Hartford; H. P. Wood, Boston; Oakes Ames, Milton; S. A. York, E. M. Bradley and H. E. Warren, all of New Haven. The treasurer will be A. B. Tenney and Horace P. Wood will be Clerk. The new Company will take immediate action to improve the service and will make extensive repairs."

WE understand that the Westboro (Mass.) Gas and Electric Company will extend its electric service to the adjoining town of Northboro.

A CORRESPONDENT in Buffalo, N. Y., sends the following: "Justice Kenefick's decision denying the application of Lewis Stockton, of the Referendum League, for an injunction restraining the city of Buffalo from carrying out the provisions of its contract with the Buffalo Gas Company, has been affirmed by the Appellate Division of the Supreme Court. Mr. Stockton brought his suit in the form of a taxpayers' action, and among the many contentions charging illegality, the main one was that the contract did not conform with the specifications, and that it gave the Company the right to supply patented Welsbach burners and lamp heads for which it did not bid when the tenders were asked for. He contended the city could not contract for patented articles without first advertising for competitive bids. The argument of Corporation Counsel Feldman, who represented the city in this case, was that the city did not 'purchase' the patented articles, but was using them for a time. The question of ownership was to remain with the Company. It is not expected that Mr. Stockton will carry the case any higher."

MR. GEORGE C. DANFORTH has sold his interest (which amounted to control) in the Independence Coke and Gas Company, of Jefferson City, Mo., to a syndicate headed by Mr. Thomas A. Rockwell, of Chicago.

IT is said that the proprietors of the Owatonna (Minn.) Gas, Electric and Heating Company intend to construct an up-to-date gas plant. They have carried on an electric supply there for some years.

IT is reported that the Consolidated Railway and Light Company, of Philadelphia, proposes to construct a gas plant in Fernandina, Fla. It is estimated that the plant will cost $60,000.

THE Springfield (Mass.) Gas Company has petitioned the Board of Gas and Electric Light Commissioners for permission to increase its capital stock from $700,000 to $900,000.

THE Cincinnati (O.) Gas and Electric Company will extend its main system to Silverton.

MR. MOULTRIE M. SESSIONS is considering the advisability of constructing a gas plant in Marietta, Ga.

MR. M. E. SPRINGER and associates, of Des Moines, Ia., are proposing to build a gas works in Mt. Ayer, Ia. The Company, which is known as the Mt. Ayer Gas Company, has been granted a franchise.

THE capital stock of the Milwaukee (Wis.) Coke and Gas Company is to be increased from $1,000,000 to $2,000,000.

THE Louisville *Post* says that the properties of the Paducah (Ky.) City Railway Company, the Paducah Gas and Fuel Company and the Paducah Power Company has been turned over to Stone & Webster, of Boston. The Company controls 27 like systems, and will spend about $350,000 in improvements. A new Company has been formed, called the Paducah Light and Traction Company, with a capital of $2,000,000 of 5 per cent. bonds, $1,000,000 of preferred and $1,000,000 common stock. Of the bonds $575,000 have been issued, $625,000 held in the treasury to take up bonds of the various companies merged and $800,000 held for future betterments. Of the preferred $600,000 has been issued, the remainder being held in the treasury. All of the common stock has been issued. The securities will shortly be listed on the Louisville exchange.

MR. J. B QUIGLEY and associates, of San Francisco, Cal., have been granted the right to construct and operate a gas works in Tonopah, Nevada. It is to be of the coal gas type.

AT the annual meeting of the Dover (N. H.) Gas Light Company the officers elected were: Directors, Albert Wallace, Charles B. Davis, George E. Wallace, John Kivel, George E. Macomber, Herbert L. Shepherd, J. F. Lang; President, Albert Wallace; Vice-President, George E. Macomber; Treasurer, H. L. Shepherd; Assistant Treasurer, George G. Welch; Clerk, Leslie P. Snow; General Manager, Thomas Hawken.

A GAS supply for Needham, Mass., will be laid next spring.

MR. MILTON E. ALLES, Second Vice-President of the Riggs National Bank, of Washington, D. C., has been elected to the vacancy in the Board of Directors of the Washington Gas Light Company caused by the death of Mr. John C. Poor.

THE plant of the Homer and Cortland Gas Light Company, of Cortland, N. Y., was damaged by fire the morning of the 20th inst.

IN the suit for damages to person and property brought against the Jamaica Plain (Mass.) Gas Light Company by Mrs. Emma A. Houston, on account of an explosion of gas in the cellar of her residence in Chauncey place, some odd evidence was produced. The house dog had been put in the cellar for the night, and shortly afterwards his incessant whining caused Mrs. Houston to make an investigation. The cellar was, of course, quite dark, and when Mrs. Houston lighted a match a loud explosion occurred. As gas was not used in her house the surprise of those who went to her aid was considerable. Later on it was shown that the gas had gotten into the cellar through an unused drain, the original escape being traced to a broken service to a lamp post on the street some 30 feet from the house.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

MONDAY, OCTOBER 30, 1905.

The Market for Gas Securities.

The easing off of the rates for money seems to have caused a slight slump on the average for shares of all sorts. Quotations on local account, however, are rather on the nominal side. One of the candidates for the place of Mayor of the largest city in America declares that he will, if elected, see to it that all gas supply hereabouts will be put under municipal control. His name is Ivins, and there will be no public prefix to it after the white wings deposited on the 7th prox. have been counted. A good purchase on speculative account would seem to be Baltimore Consolidated at any figure under 90. The bond market is always on the increase, if quotations can be relied upon; and they usually can.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.
16 WALL STREET, NEW YORK CITY.
OCTOBER 30.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

U. F. City Companies.	Capital.	Par.	Bid.	Asked.
Consolidated	$73,177,000	100	183½	183½
Central Union, Bonds, 5's	3,000,000	1,000	108	110
Equitable Bonds, 6's	1,000,000	1,000	..	10[illegible]
" 1st Con. 5's	2,300,000	1 000	118	120
Mutual	3,500,000	100	275	290
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	111	114
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	41
1st Mtg Gold Bds. 5 p. ct.	1,000,000	..	98	104
Northern Union, Bonds, 5's	1,250,000	1,000	105	107
New York and East River.. Bonds 1st 5's	3,500,000	1,000	112	114
" 1st Con. 5's	1,500,000	..	106½	108½
Standard	5,000,000	100	140	160
Preferred	5,000,000	100	155	175
Bonds, 1st Mortgage, 5's	1,500,000	1,000	111	114
Yonkers	999,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	150	190
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	3/16	¼
" income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	10	12
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	0	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	106	106½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	..	95
Preferred	3,026,500	100	107½	103
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	86½	88
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880.000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
For Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
" Bonds, 5's	10,500,000	..	110	110¼
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	..
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	108½	109
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1 000.000	1,000	60	65
Louisville	2,570,300	50	143	145
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	103¾	104
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000		104½	105¼
San Francisco, Cal	15,800,000	100	58½	58¾
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	113½	115
General Mortgage, 5's	2,465,000	1,000	96¾	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,600,000	20	29.¾	300
First mortgage 6's	600,000			
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600,000	50	230	

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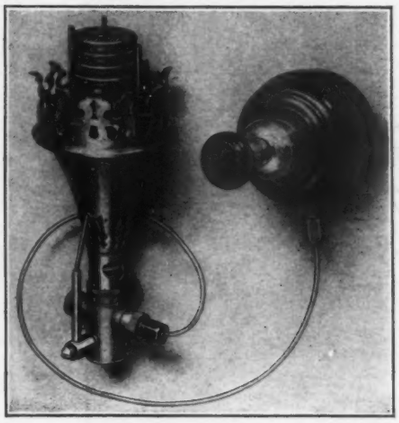

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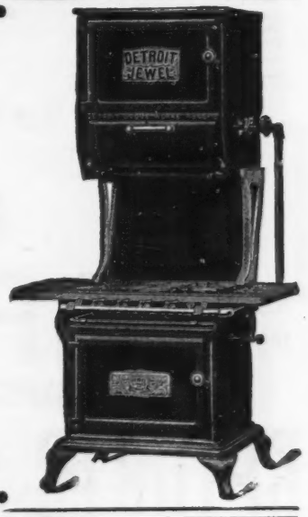

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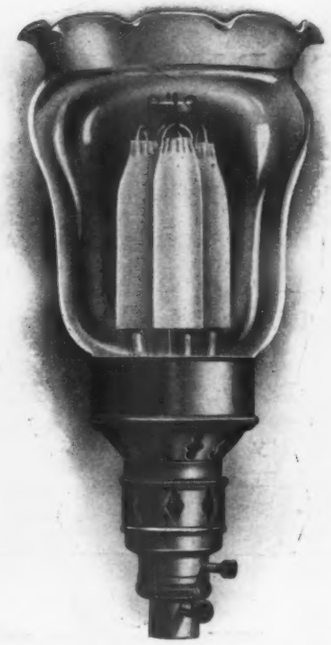

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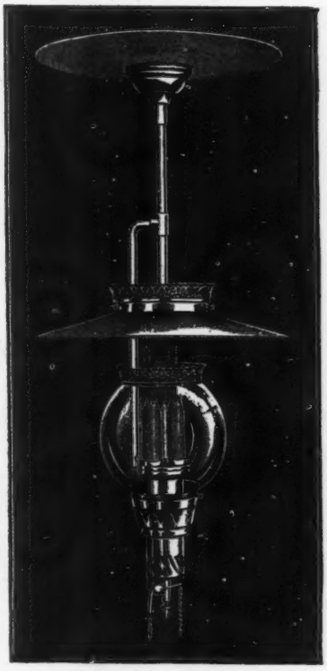

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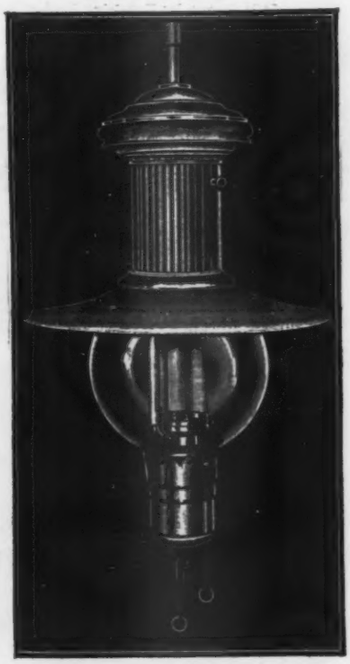

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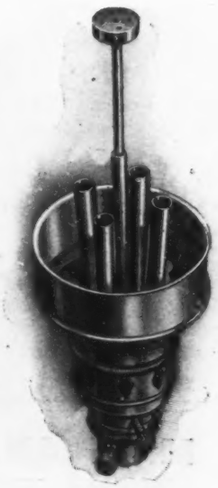

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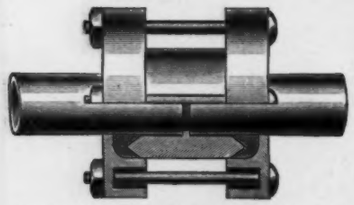

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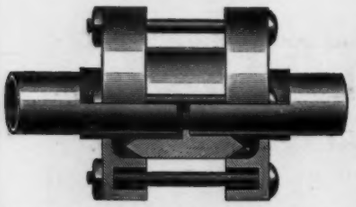
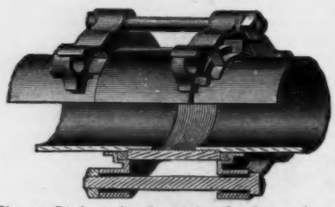


Insulating Coupling, Style 5, for Plain End Wrought Iron Pipe.



Clamp, Style 4, for Repairing Leaks on Screw Collar.

Long Sleeve, Style 2, for Mending Broken Lines.

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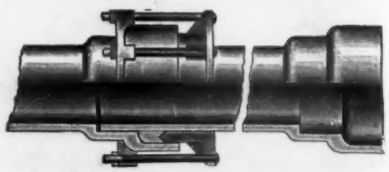
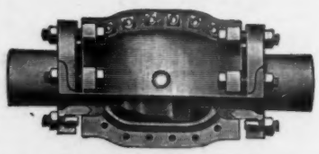
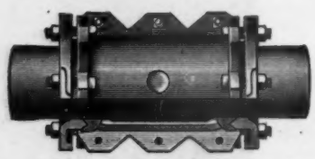


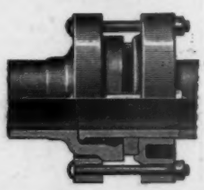
Coupling, Style 9, for Special Style Cast Iron Pipe.



Split Sleeve for Repairing Broken Bell on Cast Iron Pipe.



Split Sleeve for Repairing Broken or Cracked Cast Iron Pipe.



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Gas and water companies about to lay new mains or services will find it useful to communicate with us. Our gangs are experienced and our plant is completely equipped for street main and service laying in all branches. These are our specialties. We are in a position to quote prices which will attract the attention of the economical manager.

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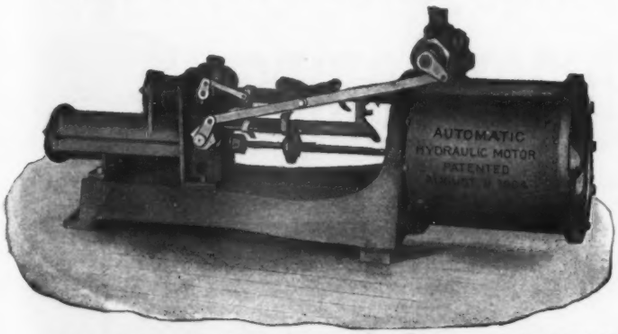

will more than double the candle power of the ordinary mantle light. Get particulars. Leased to consumers through gas companies only. An interesting and liberal proposition will be submitted to gas companies for the asking. ✻ ✻ ✻ ✻ ✻

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Cook with the half of it.

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The coldest air lies next to the floor always. The Humphrey Oval (see illustration) takes the cold air from the floor, heats it hot and forces it out at the side. Other stoves allow this heat to rise directly to the ceiling without being diffused through the room, thus taking a long time to heat the room, wasting time and fuel.

Height, 16 inches. Weight, 4½ pounds.
Price, dull nickel, per dozen....$18.00
Price, polished nickel, per dozen 24.00
Not sold in less than dozen lots.

Liberal Discounts and Prompt Shipments. :: :: :: ::

Why not send us an order to-day for your season's requirements?

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Divides in the middle. No nuts, bolts or screws.

When not in use, or to pack, pull the legs out, untwist the burner and pull it out, tuck one-half of the jacket inside the other and lay the legs and burner in the bowl. A child can do it, and, when done, it occupies a very small space.

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Nickel Cylinder Lamps,

Used either with or without shades. Supplied with round or pear globes. :: ::

Just the lamp to offer the hesitating consumer who wants a different design.

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THE CONNERSVILLE BLOWER CO.

Stand so High in the estimation of those using them?

THE ANSWER IS IN THREE WORDS:

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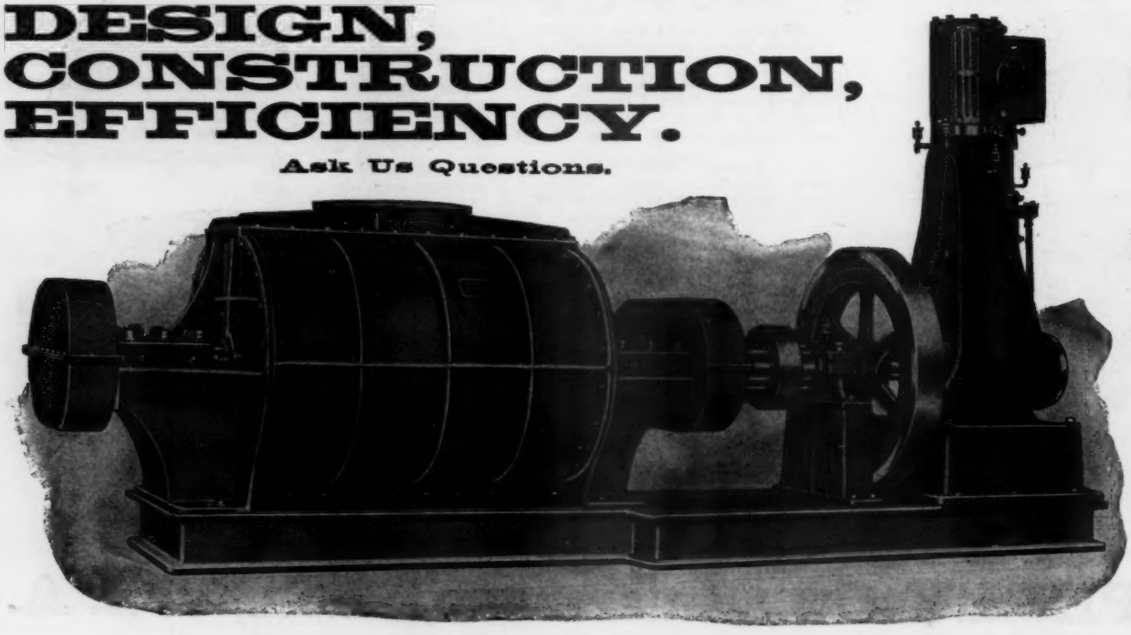

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THE BRAY BURNER

Is so well known, so thoroughly tried and so universally used that there is never a doubt as to what burner the gas man will use.

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Double and Single Gate Valves, ¼" to 72",

—FOR—

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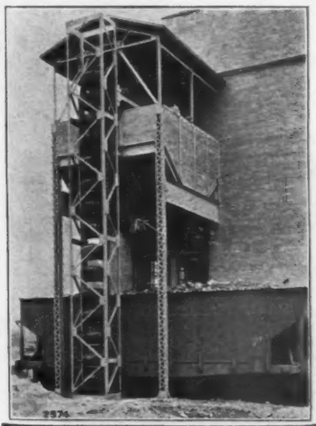

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Handling Coal and Ashes at the Boiler House of the Penna. R. R. Co., South Altoona, Pa.

Simple, clean, practical, very flexible, and adaptable to almost every condition.
The only conveyor which catches the leakage and prevents accumulation of spilled material.
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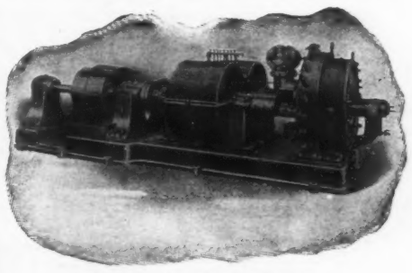

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The high character of the work done by A. M. Sutherland during the past 15 years will be strictly adhered to and all work is warranted.

Mr. Sutherland remains with the Company for two years President and Director, and will give personal attention to contracts.

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IMMERSION WASHERS.

A design embodying particularly desirable features.

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No other part of a gas cock gets the hard use that the pipe ends get when the cock is being fitted into service.

The pipe ends of Mueller Gas Cocks have a greater thickness of metal than other parts of the cock, to give them the greater strength they require. They are thoroughly prepared for the rough handling they get at the hands of the fitter.

Mueller Gas Cocks are made in straight, oval and round way patterns; the straight being made in the standard, extra and special grades the oval in the extra grade only and the round in the standard and extra grades. The cock illustrated is a straight way, special grade, flat head meter cock.

Each cock is carefully inspected and assembled, is given a 75-pound hydraulic pressure test as near like actual service use as possible, bears the maker's trade mark, and is accordingly guaranteed.

We also make tapping machines and meter connections for gas works' use. Catalogues upon application.

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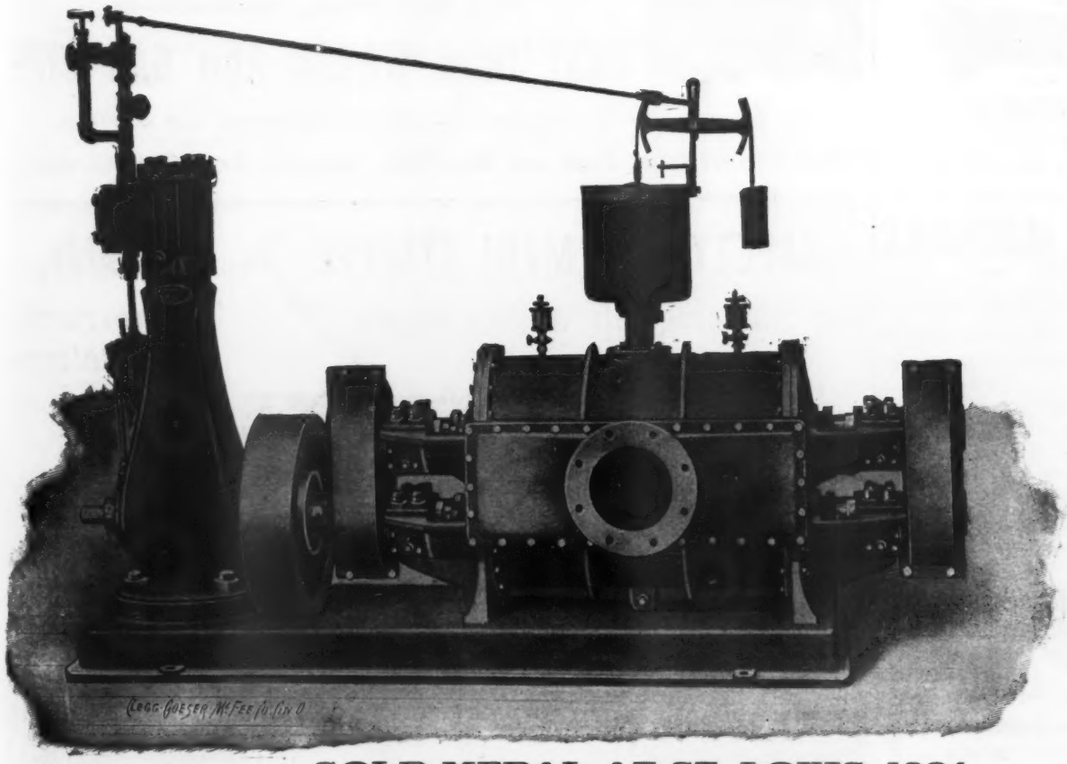

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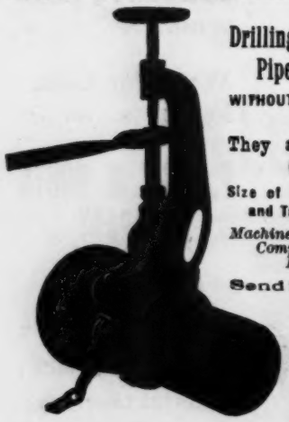
FOR WATER AND GAS.
Also, FLANGE PIPE, LAMP POSTS, Etc.

GAS TAPPING MACHINES
—FOR—



Drilling and Tapping Pipe under Pressure
WITHOUT ANY ESCAPE OF GAS.
They are Strong and Compact.
Size of Combination Drills and Taps ¾ to 4-inch.
Machines Sent to any Gas Company for Thirty Days' Trial.
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The Mueller "Swivel No 1" "Swivel No. 2" and "Swivel No. 3" Tapping Machines are made especially for tapping gas mains under pressure. They are made extra heavy in all parts, have extra long ratchet sweep and can be adjusted to any angle or corner of the ditch. The No. 1 taps up to 2-inch, the No. 2 up to 3-inch and the No. 3 up to 4-inch. The "Century Junior" makes taps from ⅛ to ¼ inch in high pressure mains. Unconditionally guaranteed. Catalogues upon application.

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Globe
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THOUSANDS IN USE WITH INCANDESCENT BURNERS.
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Plans prepared and Estimates furnished at short notice.
J. P. WHITTIER,
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CAST IRON WATER AND GAS PIPE,
FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF
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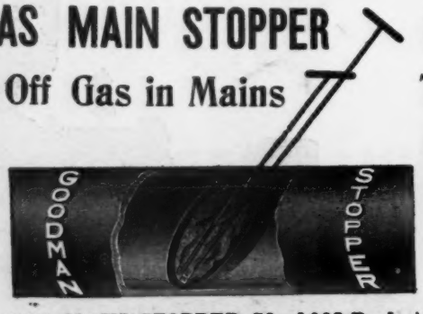
SAFETY GAS MAIN STOPPER COMPANY,
For Shutting Off Gas in Mains



Any size gas main can be shut off in 30 seconds. : : :
Temporarily during alterations and repairs. : : : :
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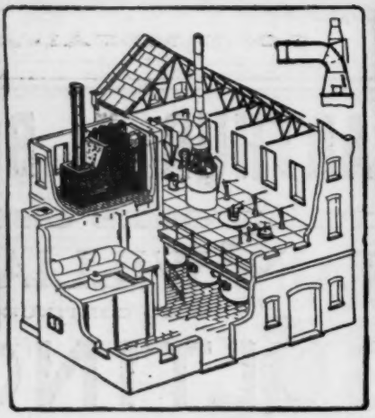

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NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

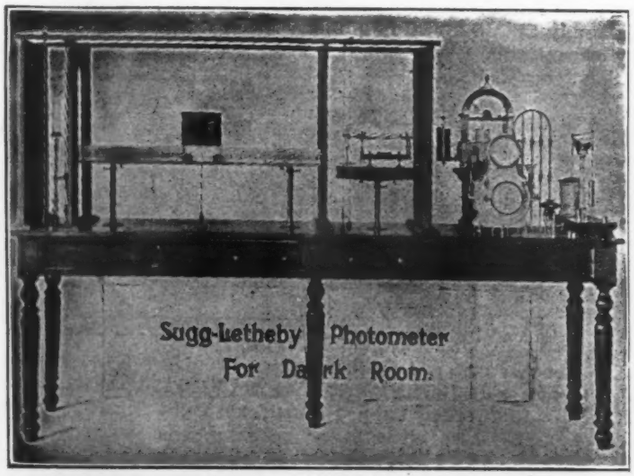
NOVEMBER, 1905.

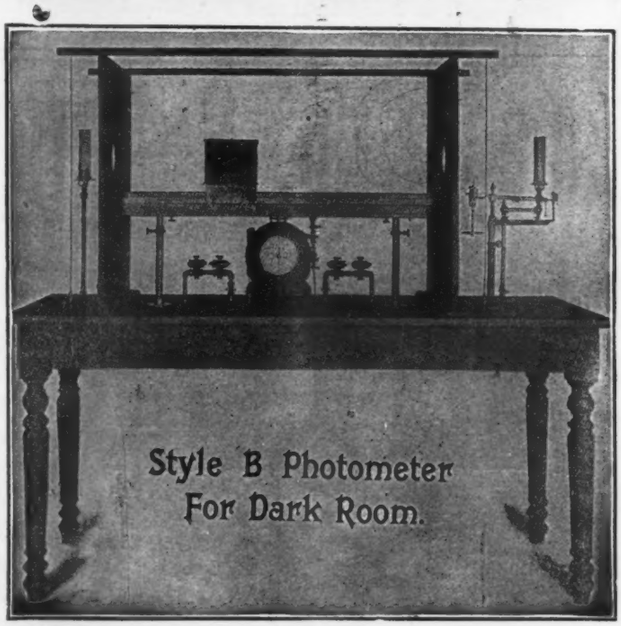
Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.
Wed.	1	8.10 PM	5.30 AM
Thu.	2	9.10	5.30
Fri.	3	10.10 FQ	5.30
Sat.	4	11 10	5.30
Sun.	5	12.10 AM	5.40
Mon.	6	1.10	5.40
Tue.	7	2.00	5.40
Wed.	8	3.00	5.40
Thu.	9	4.00	5.40
Fri.	10	No L.	No L.
Sat.	11	No L. FM	No L.
Sun	12	No L.	No L.
Mon.	13	5.10 PM	7.10 PM
Tue.	14	5.10	7.50
Wed.	15	5.10	8.30
Thu.	16	5.10	9.30
Fri.	17	5.10	10.20
Sat.	18	5.10	11.20
Sun.	19	5.10 LQ	12.30 AM
Mon.	20	5.10	1.30
Tue.	21	5.10	2.40
Wed.	22	5.10	3.50
Thu.	23	5.10	5.50
Fri.	24	5.10	5.50
Sat.	25	5.10	5.50
Sun.	26	5.10 NM	6.00
Mon.	27	5.10	6.00
Tue.	28	5.10	6.00
Wed.	29	5.10	6.00
Thu.	30	5.10	6.00

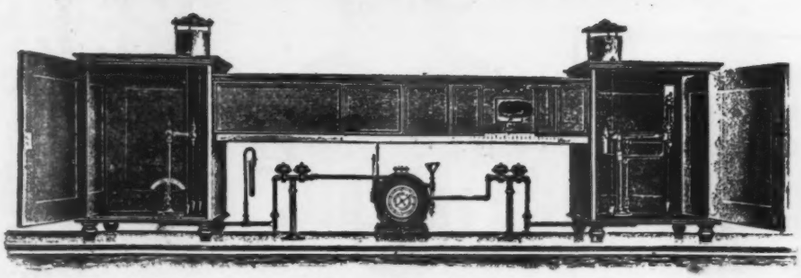
TOTAL HOURS DURING 1905.

By Table No. 1.

	Hrs.Min.
January	240.50
February	192.20
March	207.00
April	175.10
May	161.00
June	139.50
July	149.00
August	161.50
September	173.00
October	205.00
November	211.00
December	229.00
Total, yr.	2245.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

NOVEMBER, 1905.

Day of Week.	Table No. 2. NEW YORK CITY. All Night Lighting. Date.	Light.	Extinguish.
		P. M.	A.M.
Wed.	1	4.45	5.35
Thu.	2	4.45	5.35
Fri.	3	4.45	5.35
Sat.	4	4.45	5.35
Sun.	5	4.40	5.45
Mon.	6	4.40	5.45
Tue.	7	4.40	5.45
Wed.	8	4.40	5.45
Thu.	9	4.40	5.45
Fri.	10	4.40	5.45
Sat.	11	4.40	5.45
Sun.	12	4.30	6.00
Mon.	13	4 30	6.00
Tue.	14	4.30	6.00
Wed.	15	4.30	6.00
Thu.	16	4 30	6.00
Fri.	17	4.30	6.00
Sat.	18	4.30	6.00
Sun.	19	4.25	6.00
Mon.	20	4.25	6.09
Tue.	21	4 25	6.00
Wed.	22	4.25	6.00
Thu.	23	4.25	6.00
Fri.	24	4.25	6.00
Sat.	25	4.25	6.00
Sun.	26	4.20	6.10
Mon.	27	4.20	6.10
Tue.	28	4.20	6.10
Wed.	29	4.20	6.10
Thu.	30	4.20	6.10

TOTAL HOURS DURING 1905.

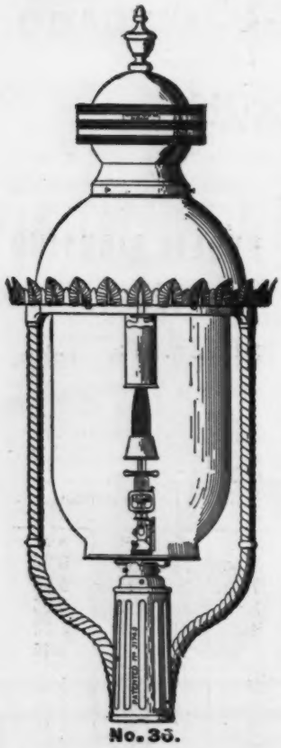
By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 97 Liberty Street. BOSTON, 814 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, Foot of Orleans Street. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



No. 35.

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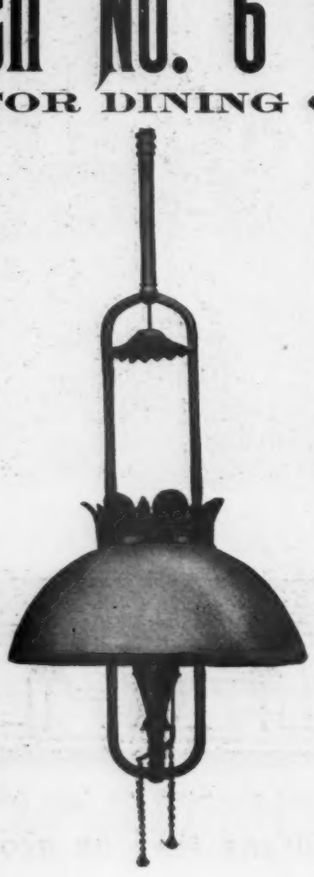

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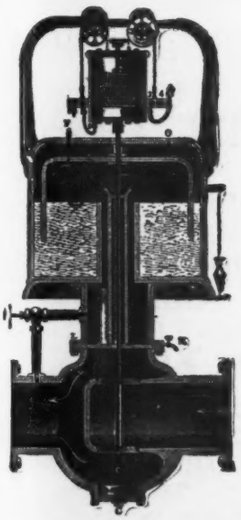

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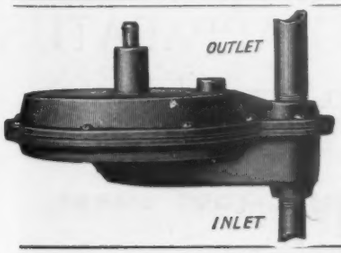

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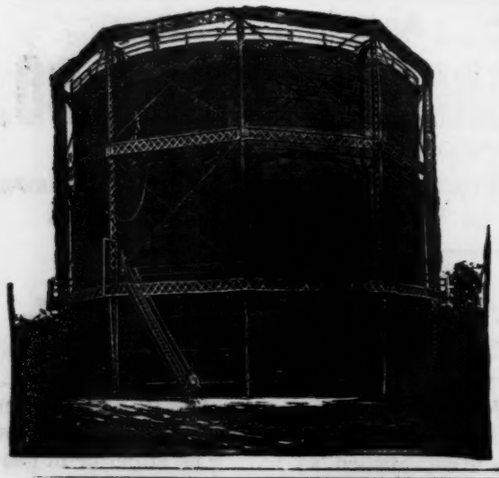

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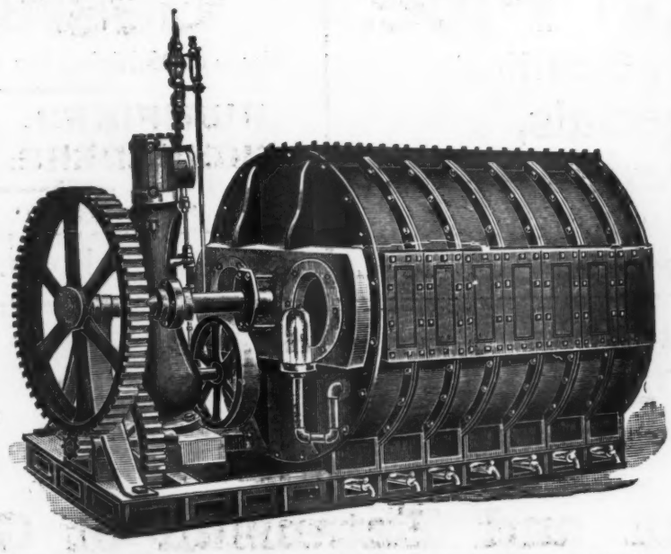

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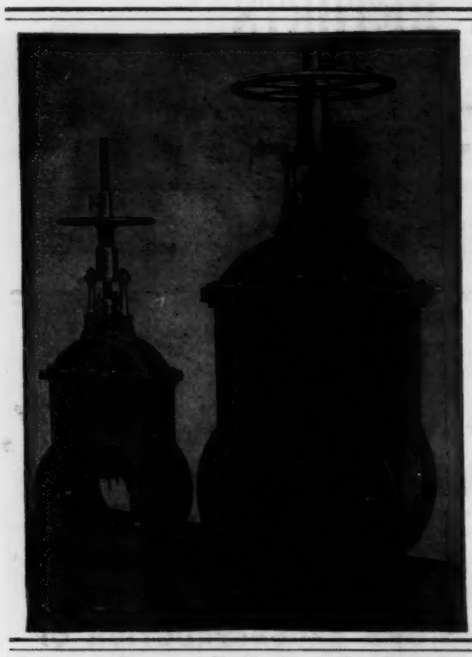

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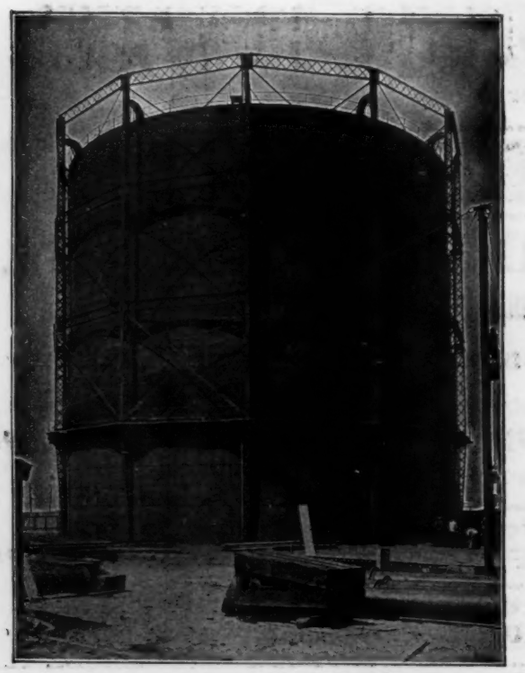

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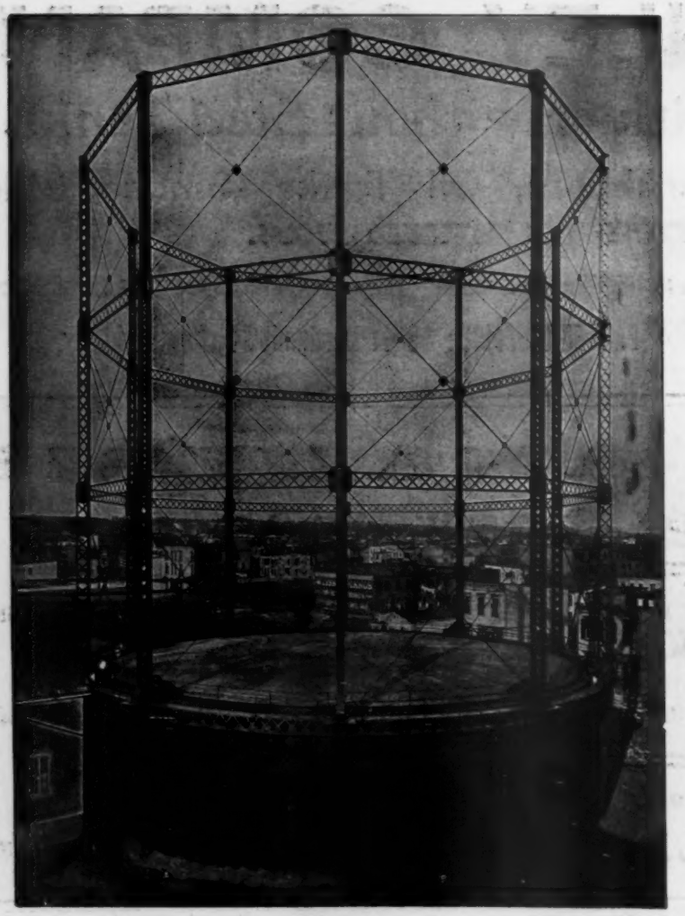

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